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STUDY OF SOIL BEHAVIOR UNDER HIGH PRESSURE. REPORT 1. VOLUME 2. RESPONSE OF TWO RECOMPACTED SOILS TO VARIOUS STATES OF STRESS

Billy B. Mazanti, et al

Georgia Institute of Technology

Prepared for:

Defense Atomic Support Agency Army Engineer Waterways Experiment Station

February 1970

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STUDY OF SOIL BEHAVIOR UNDER HIGH PRESSURE

Report I, Volume II

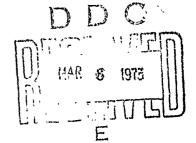
RESPONSE OF TWO RECOMPACTED SOILS TO VARIOUS STATES OF STRESS

by

B. B. Mazanti, C. N. Holland



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February 1970

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Under Contract No. DACA 39-67-C-0051

By Georgia Institute of Technology, Atlanta, Georgia

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FOREWORD

This report presents the results of a research project conductd by the Georgia Institute of Technology, Atlanta, Georgia, under the direction of Dr. B. B. Mazanti, Associate Professor of Civil Engineering. Mr. C. N. Holland served as Associate Director of the project.

There are three separate volumes documenting this project. Volume I describes the development of equipment and test procedures, soil analysis and specimen preparation, and analysis of results. Volume II contains the basic results of all tests conducted for this program in the form of stress-strain plots. Volume III contains the numerical tabulation of test data in the form of computer sheet printout. Only a limited number of copies of the Volumes II and III were published; however, interested readers may borrow a copy on 30-day loan from the Research Center Library, Waterways Experiment Station.

The Georgia Institute of Technology has been engaged in research concerned with the effects of high pressure on soil and rock for approximately ten years. During this time period, a considerable amount of equipment and instrumentation has been developed for high pressure testing, financed almost entirely by Georgia Tech. Much of the equipment and instrumentation utilized in the performance of this research was of such origin.

This report was requested and authorized by Mr. J. G. Jackson, Jr., Impulse Loads Section, Soil Dynamics Branch, under the direction of Messrs. W. J. Turnbull and A. A. Maxwell, Chief and Assistant Chief, respectively, Waterways Experiment Station Soils Division. The work was part of Contract No. DACA 39-67-C-0051, Project B-602, and was conducted for the U. S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi, under Defense Atomic Support Agency sponsorship, during the period November 1967 through November 1968.

Directors of the Waterways Experiment Station during the performance of this work and preparation and publication of this report were COL John R. Oswalt, Jr., CE, and COL Levi A. Brown, CE. Technical Directors were Messrs. J. B. Tiffany and F. R. Brown.

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LIST OF SYMBOLS

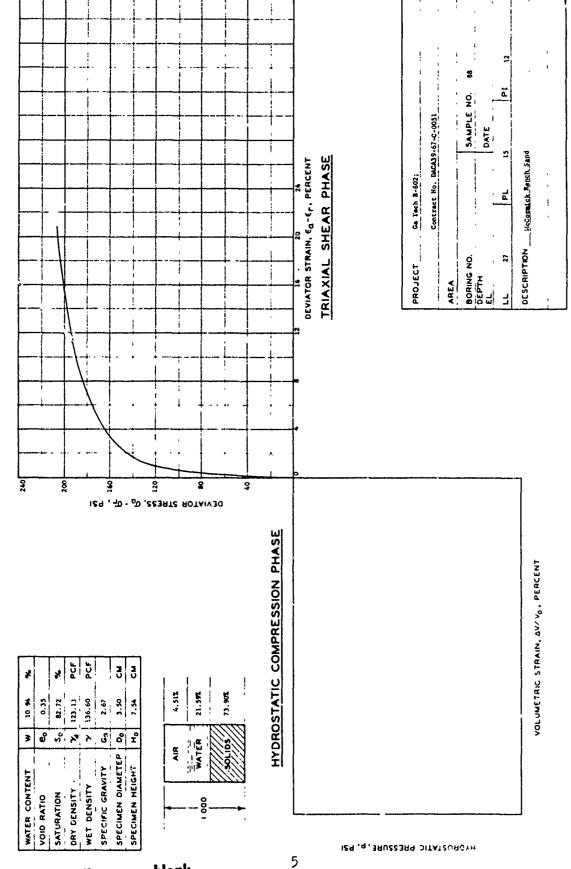
p	Hydrostatic Pressure
c	Normal Stress
σ_1	Major Principal Stress
σ_2	Intermediate Principal Stress
σ_3	Minor Principal Stress
σa	Axial Stress
$\sigma_{f r}$	Radial Stress
τ	Shear Stress
E	Strain
€ a	Axial Strain
$\epsilon_{f r}$	Radial Strain
Δ	Volume Change
v _o	Original Volume
$\Delta V/V_{o}$	Volumetric Strain
к°	Condition of No-Lateral-Strain

SECTION I

McCORMICK RANCH SAND STRESS-STRAIN PLOTS

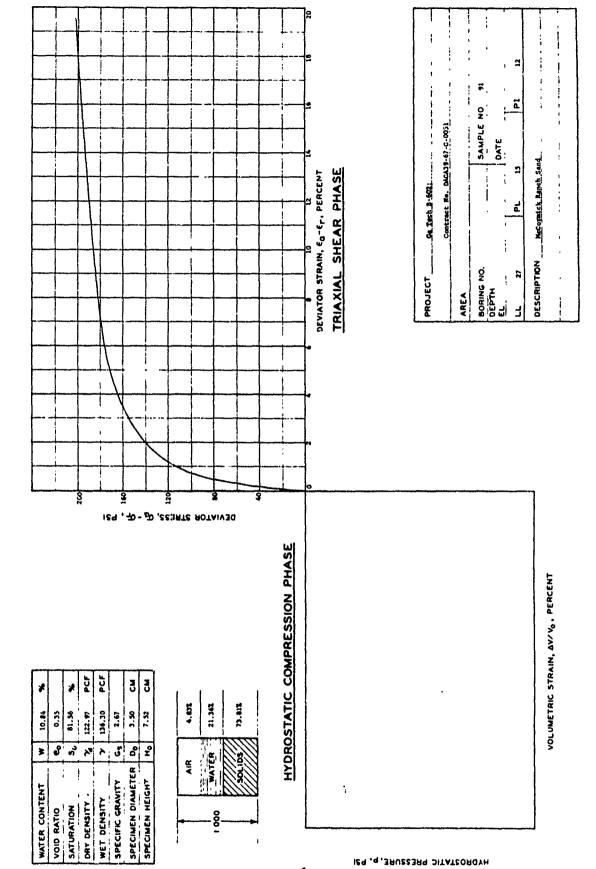
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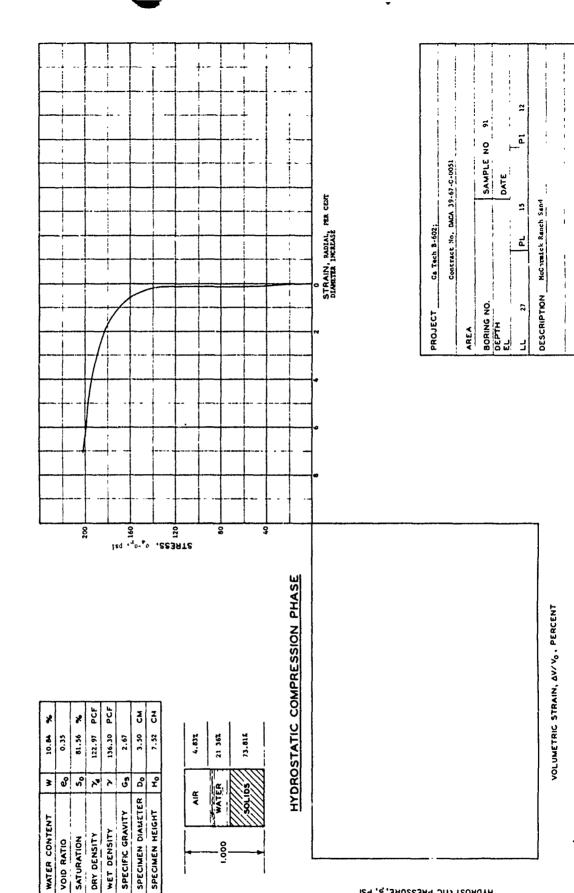


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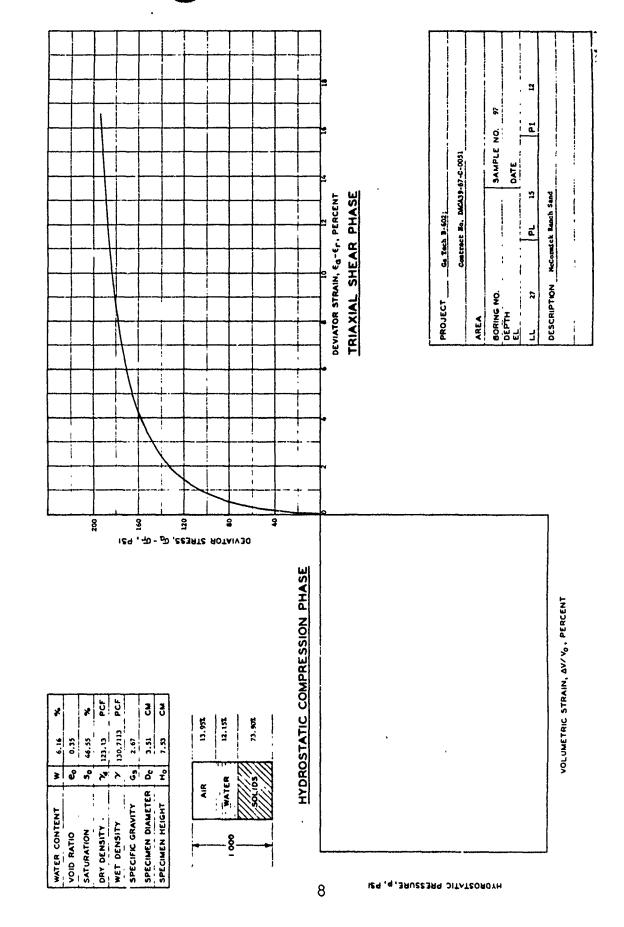


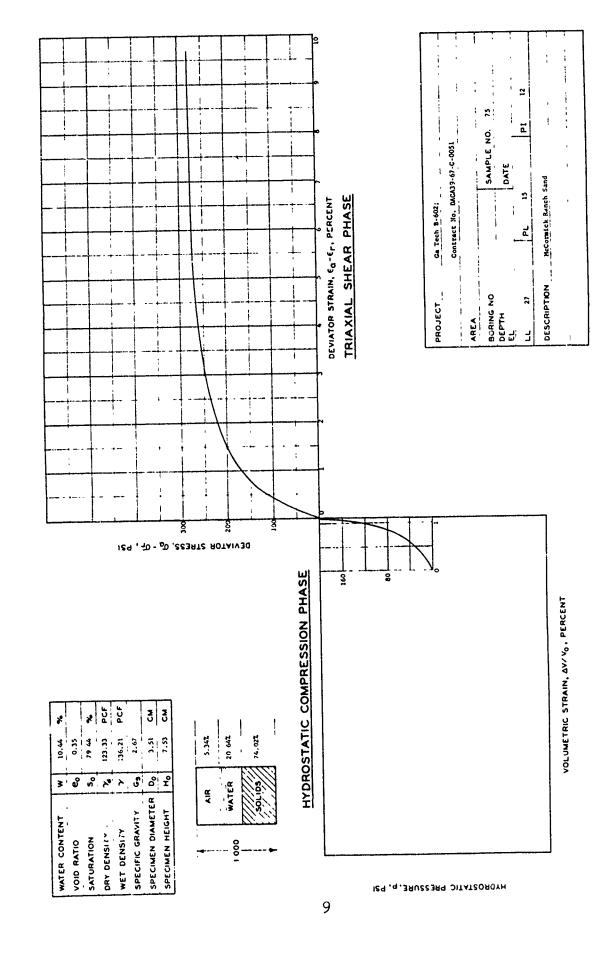
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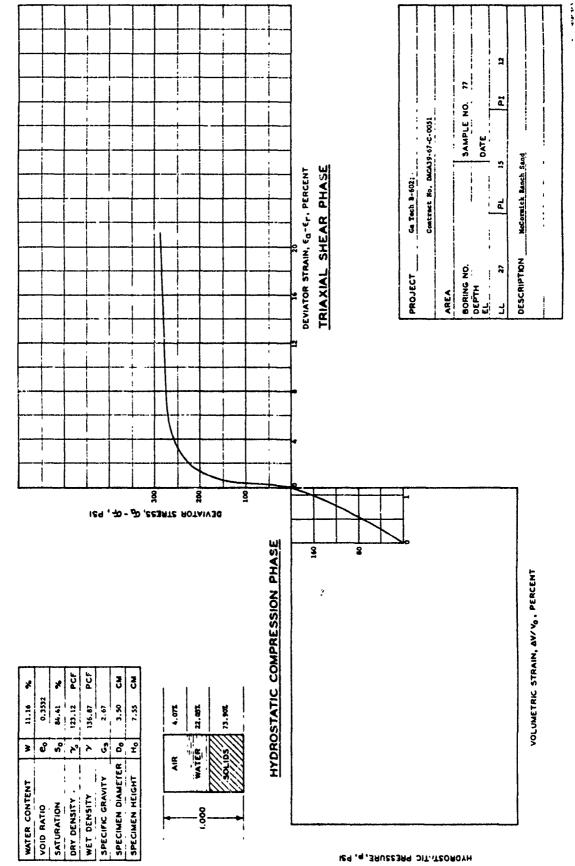




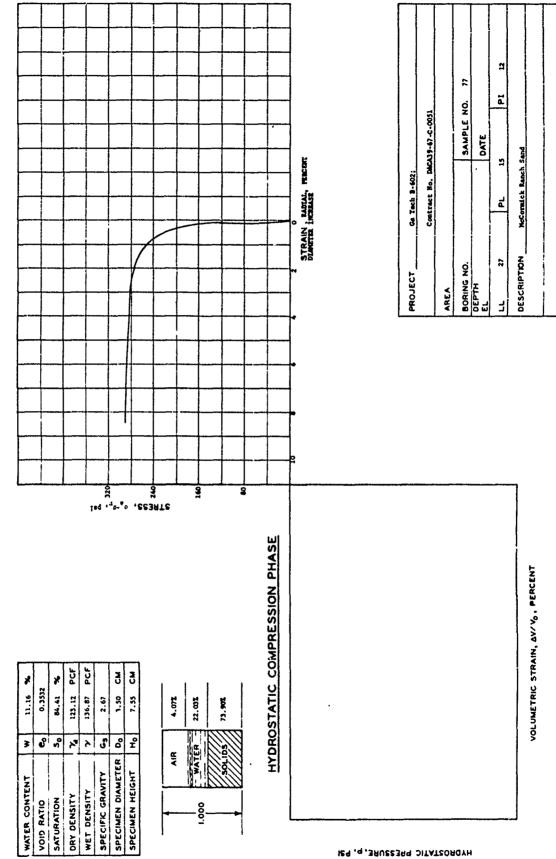
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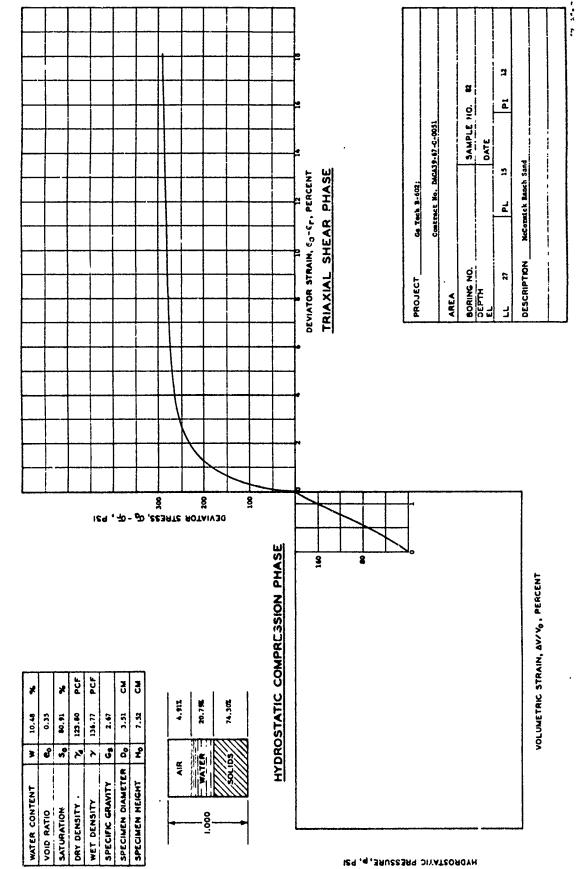
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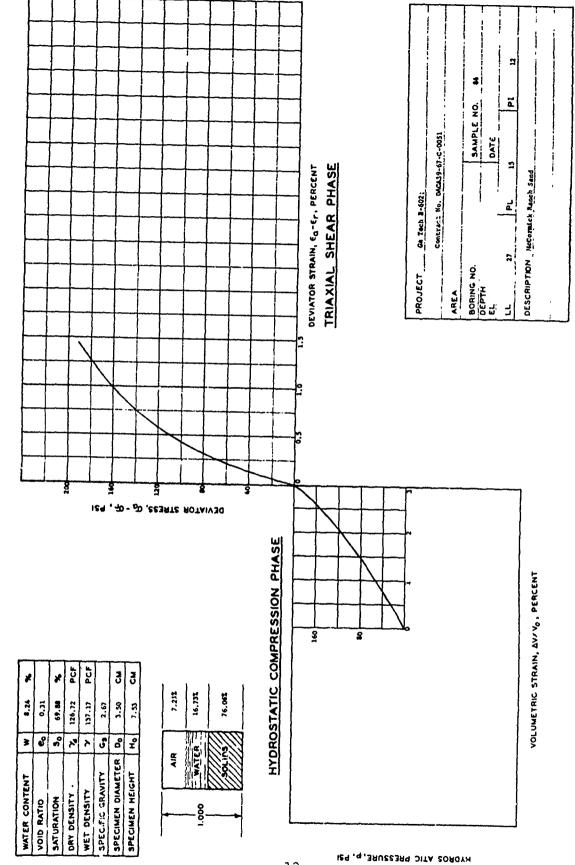
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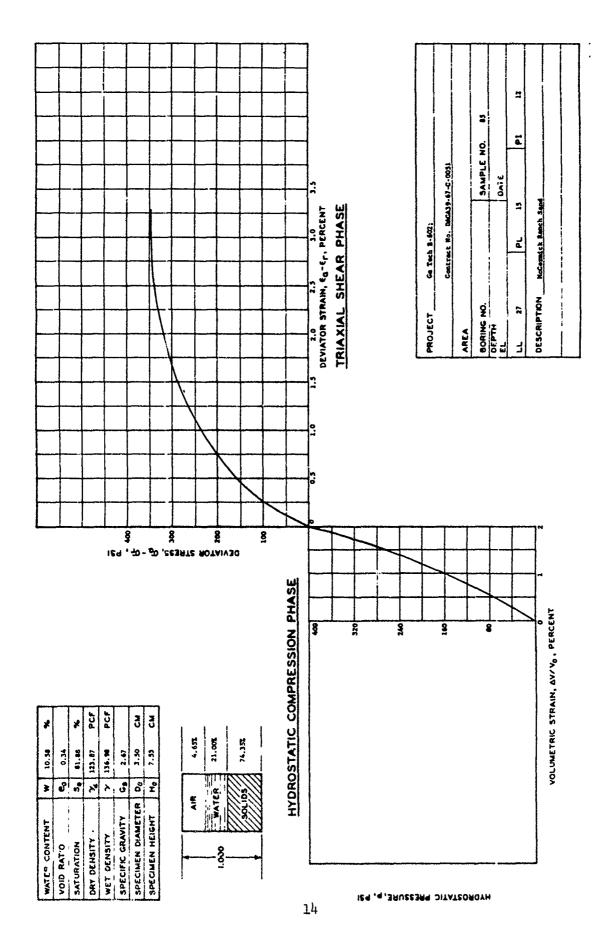
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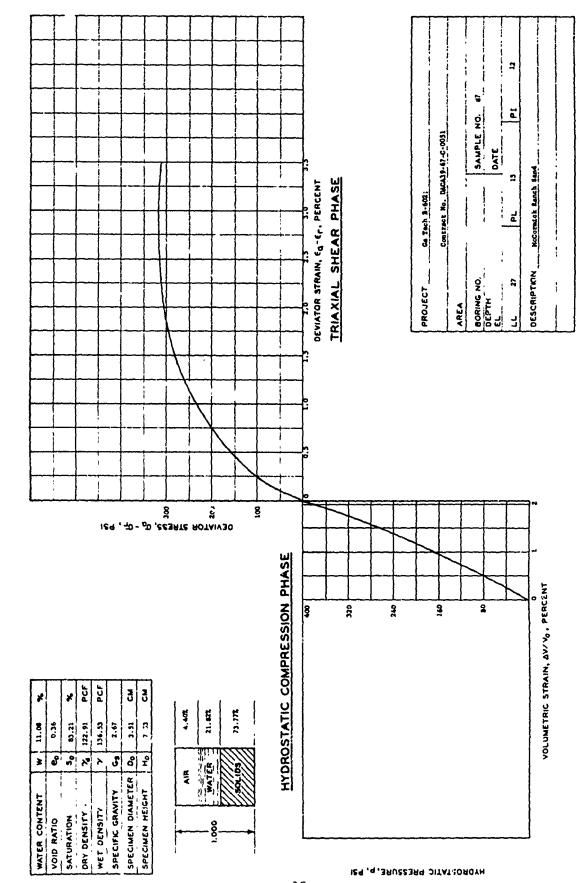




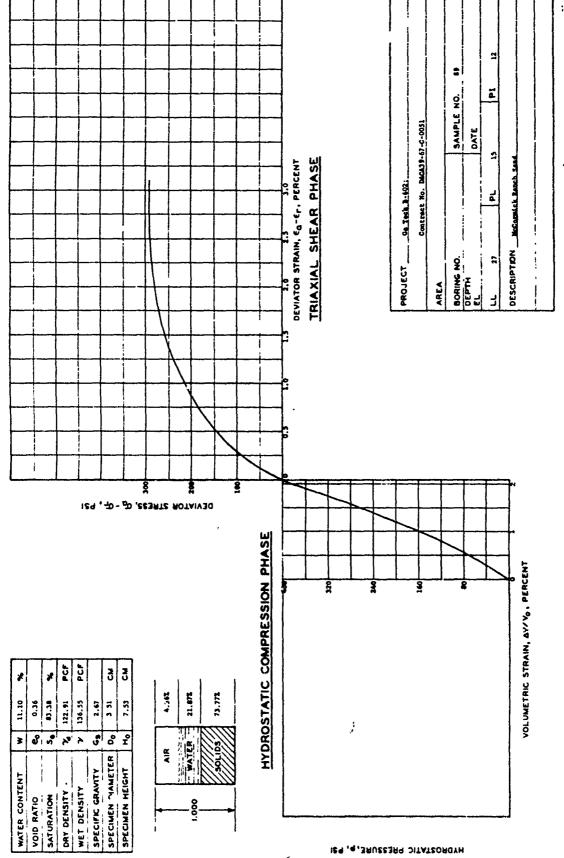


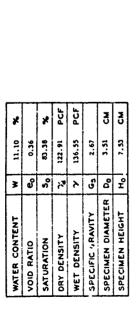
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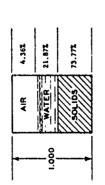


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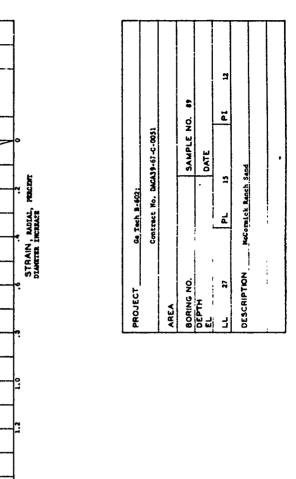
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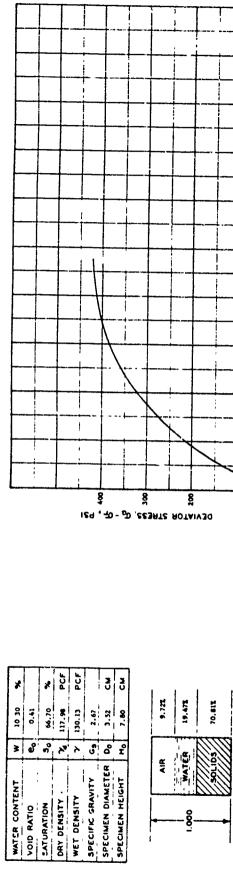
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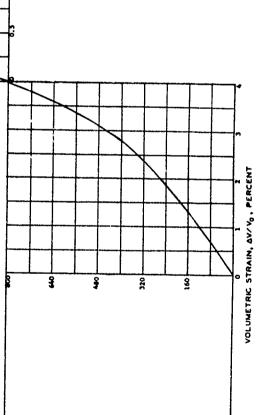
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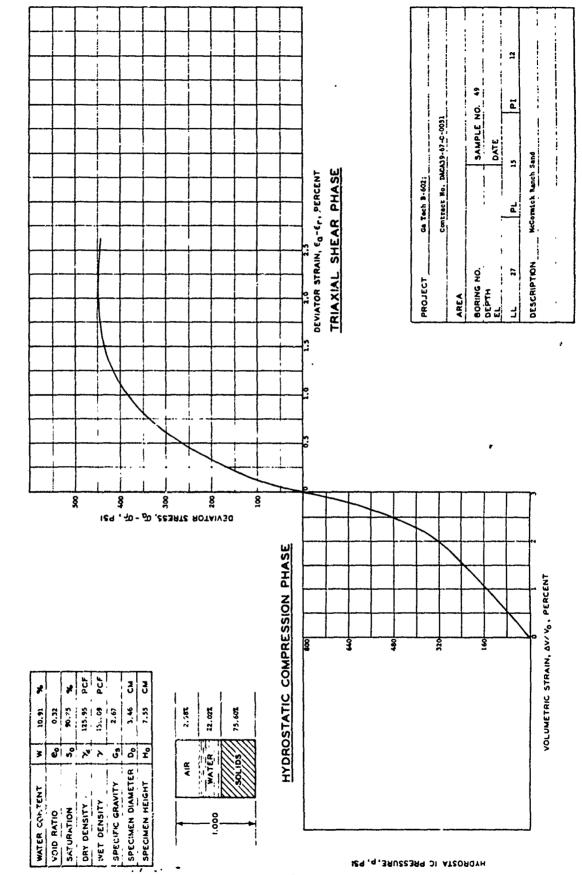
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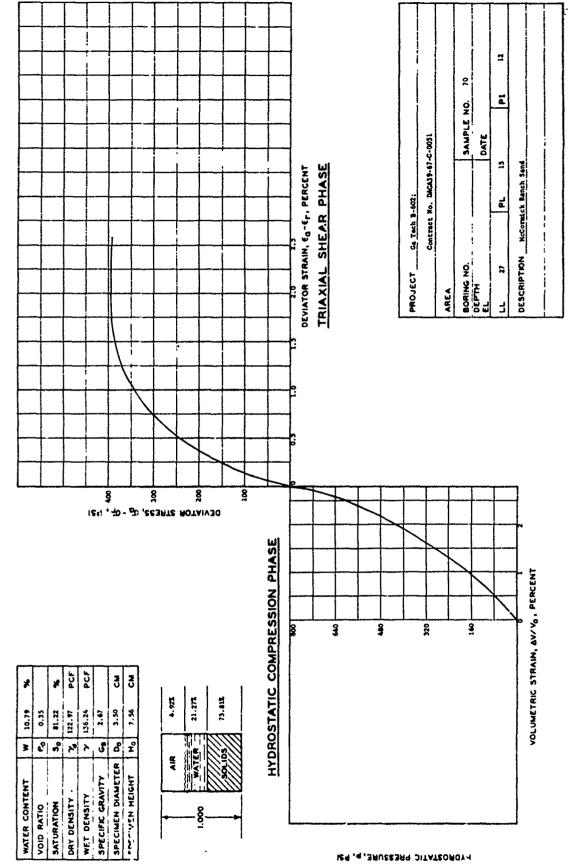
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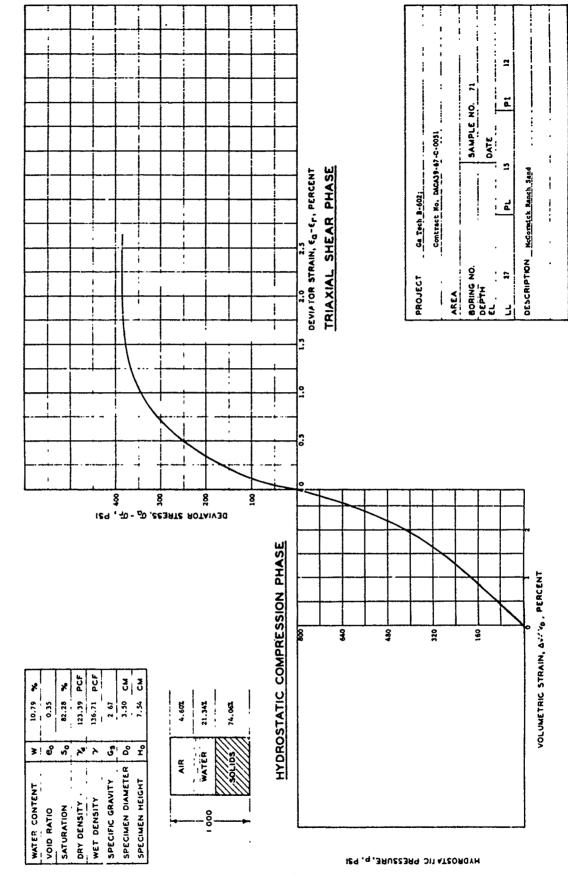
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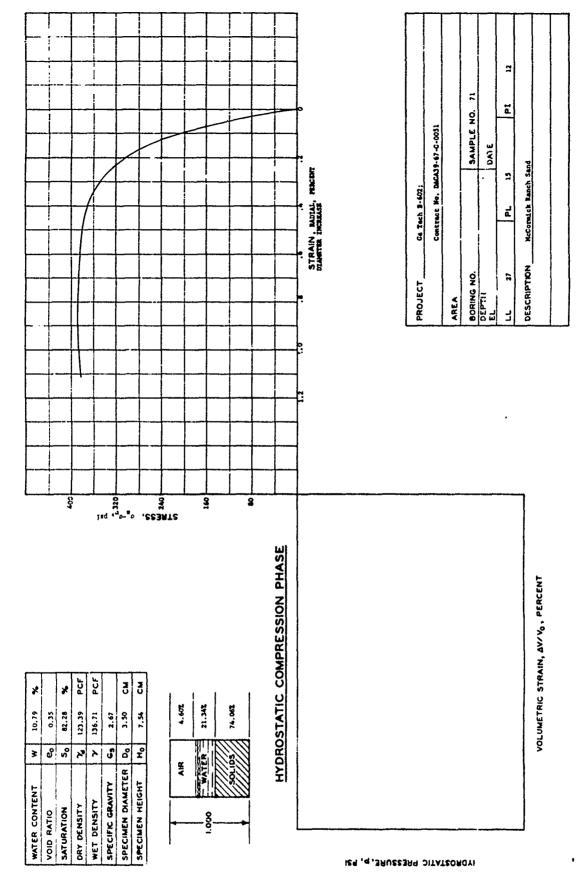
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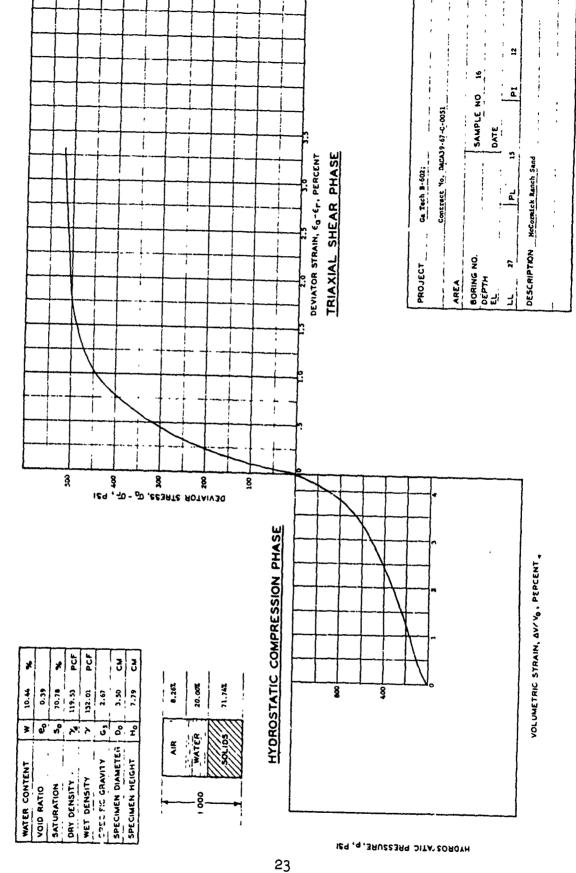


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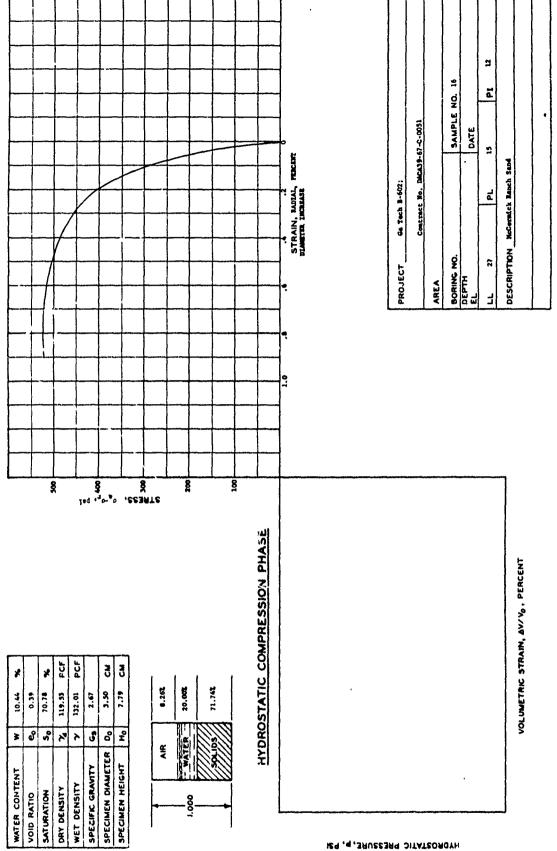


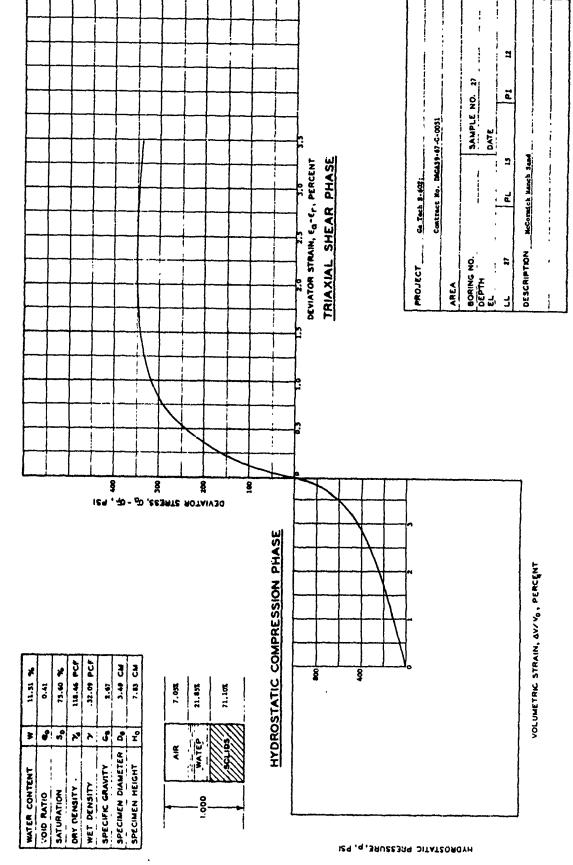


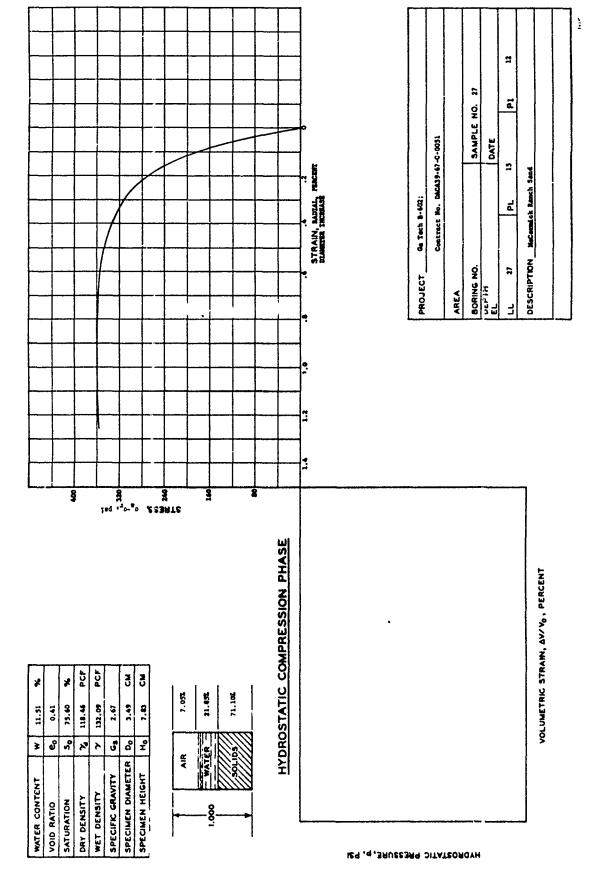


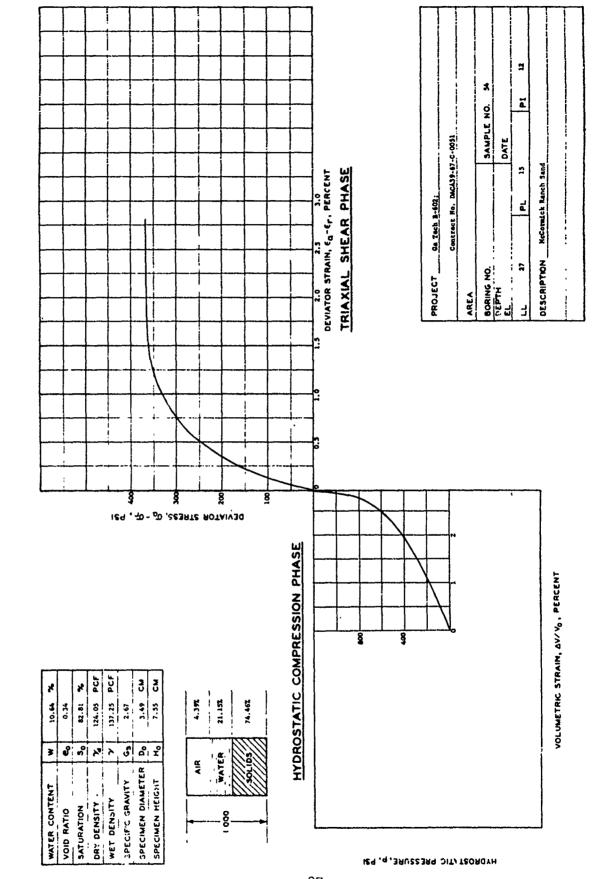


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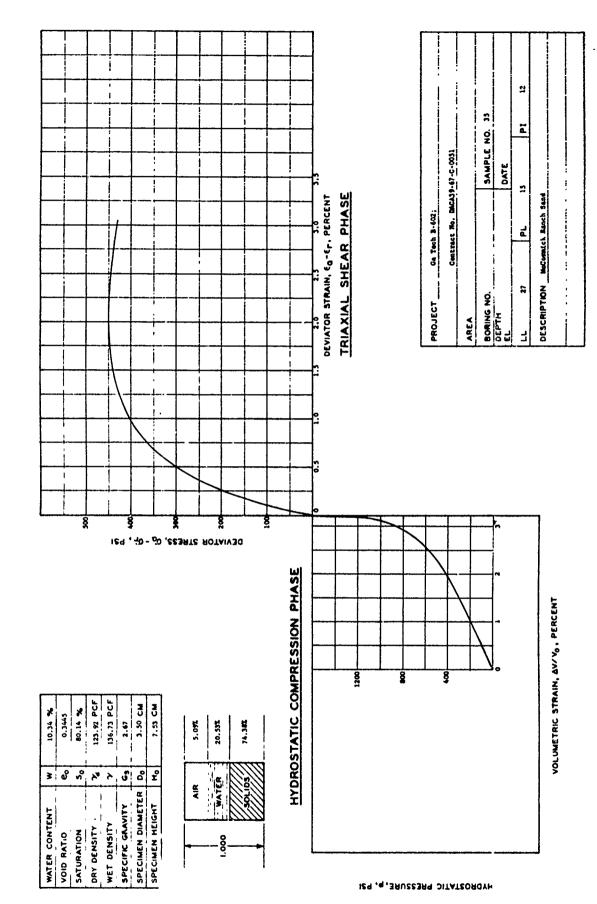


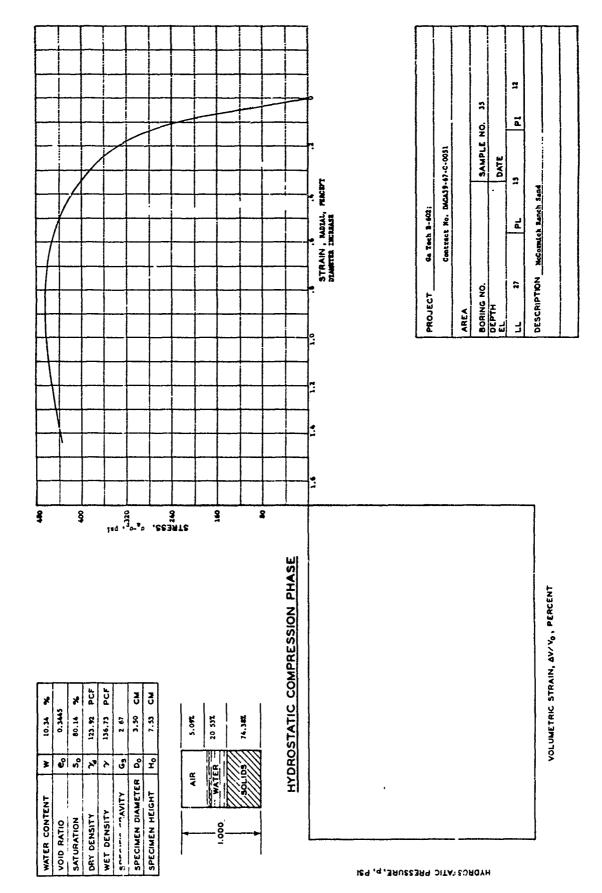


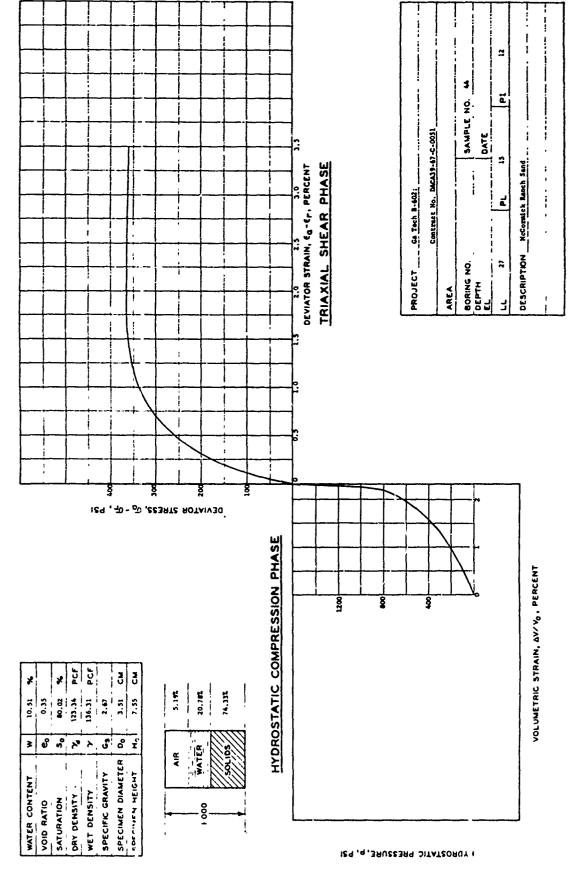


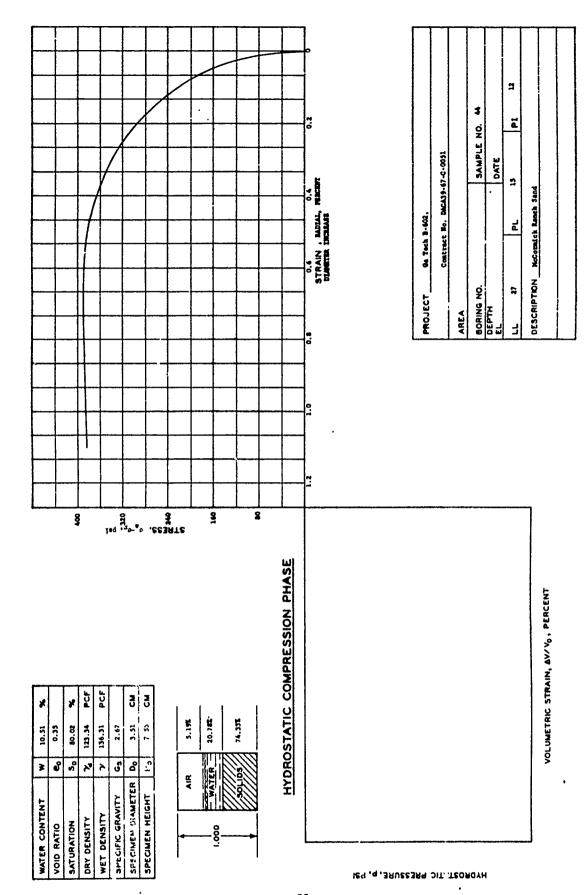
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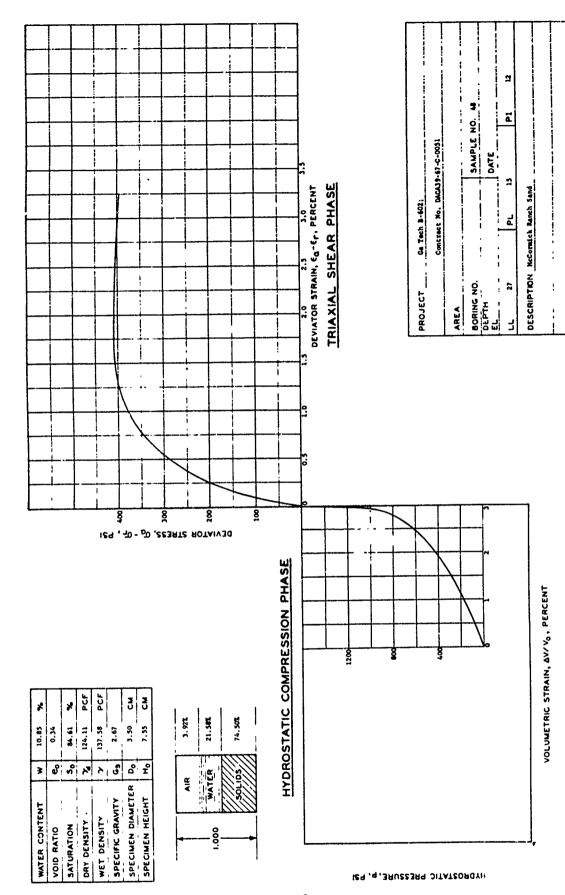


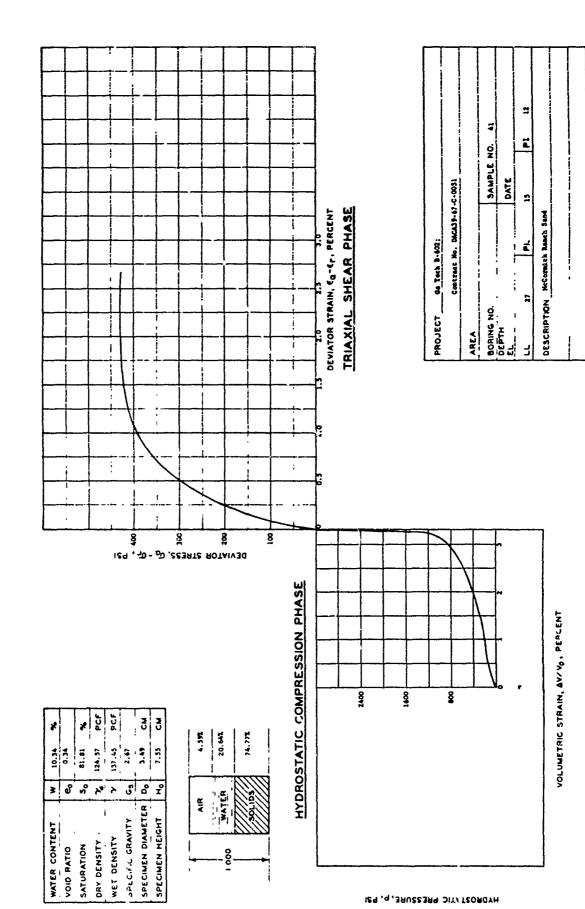


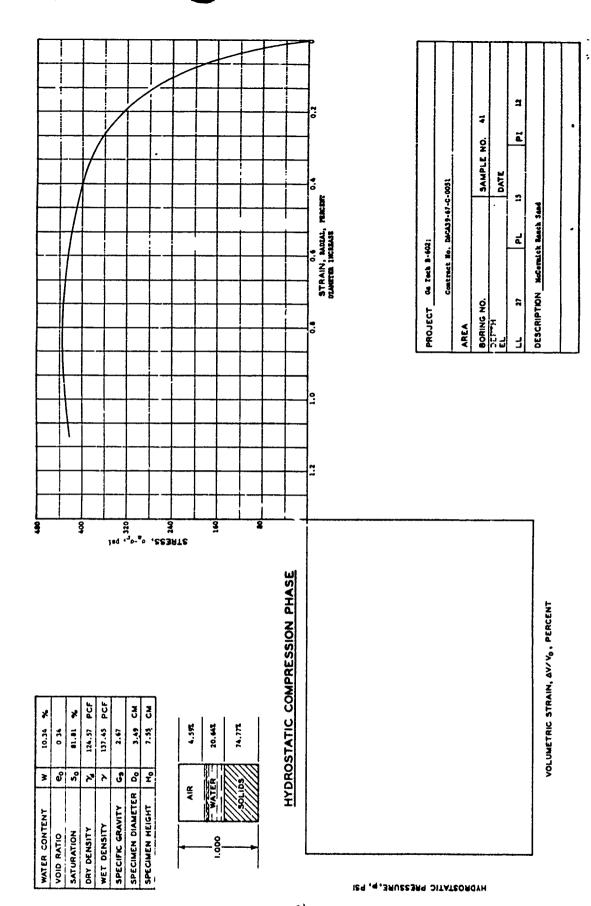


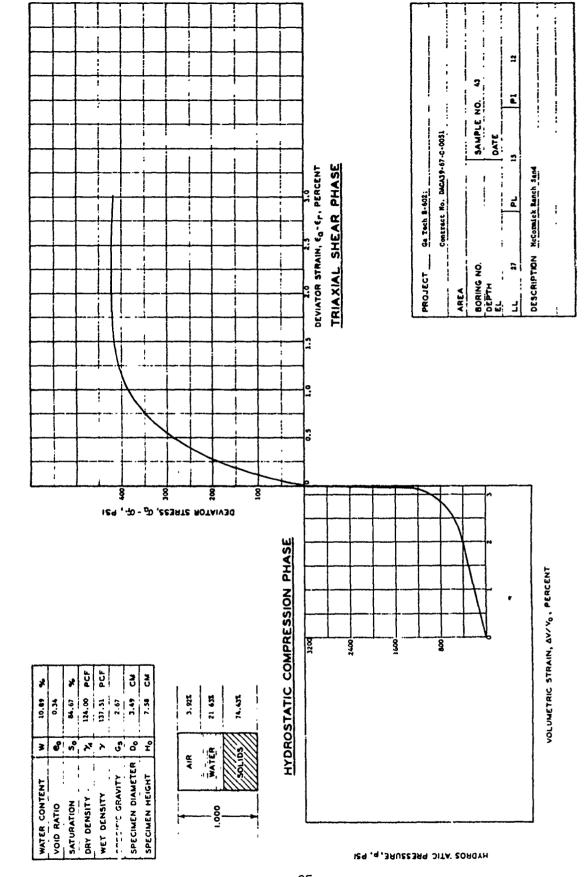
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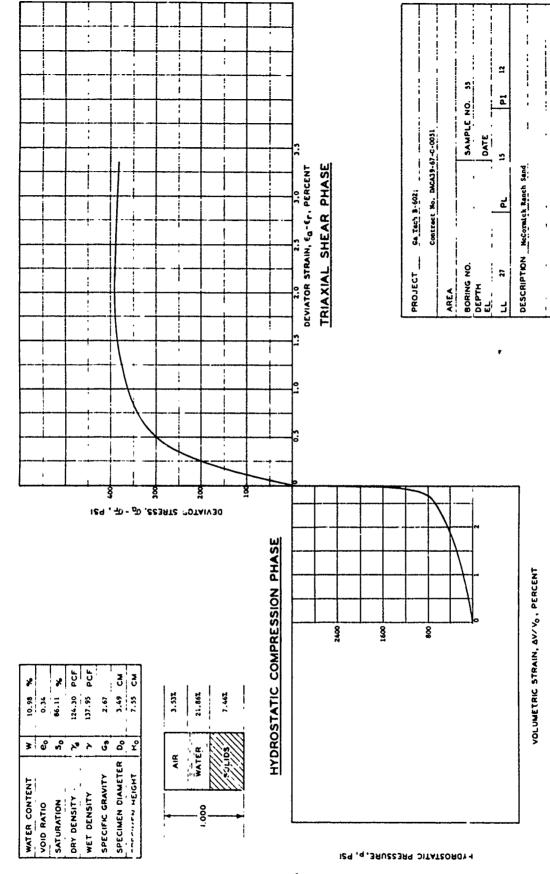


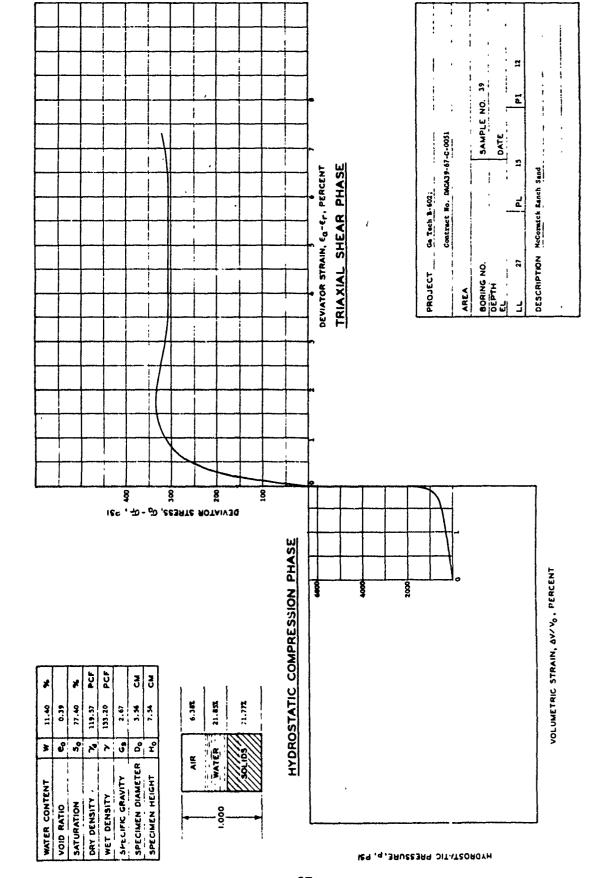




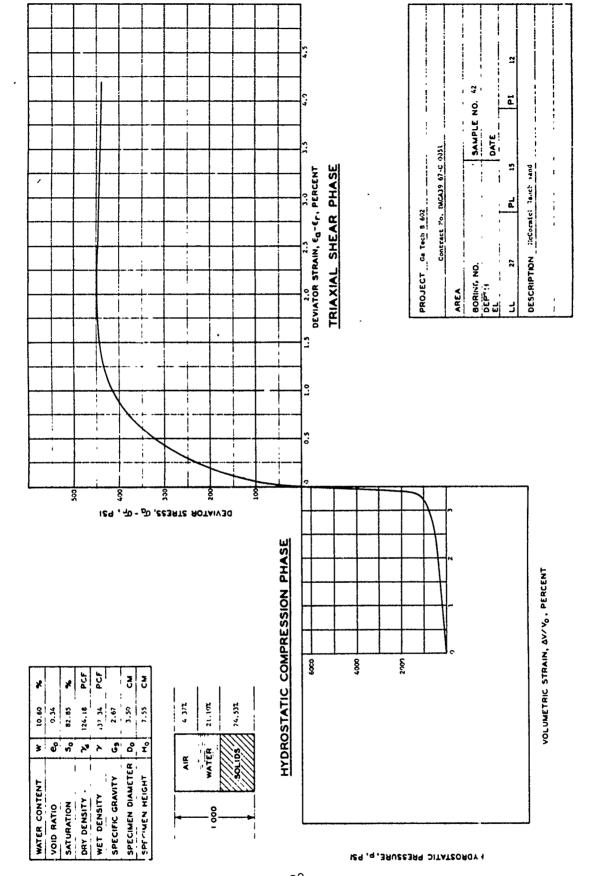


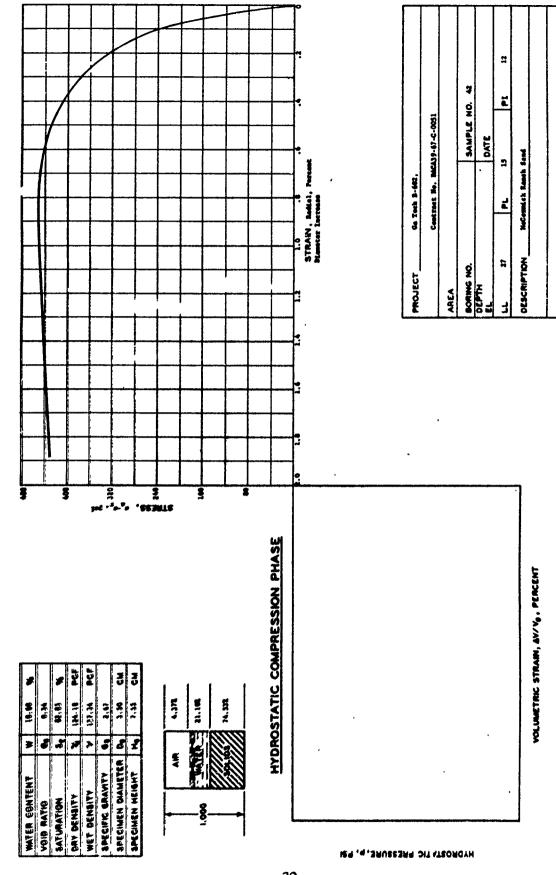
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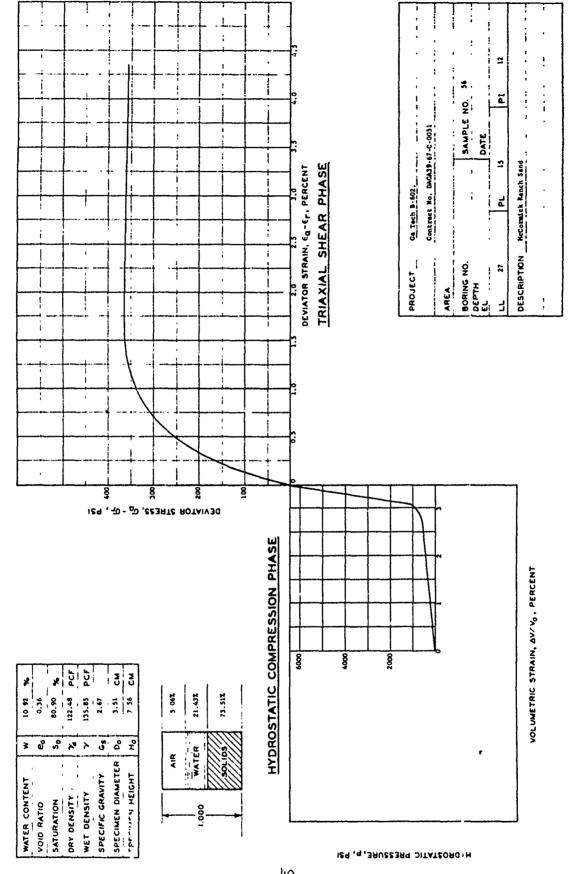
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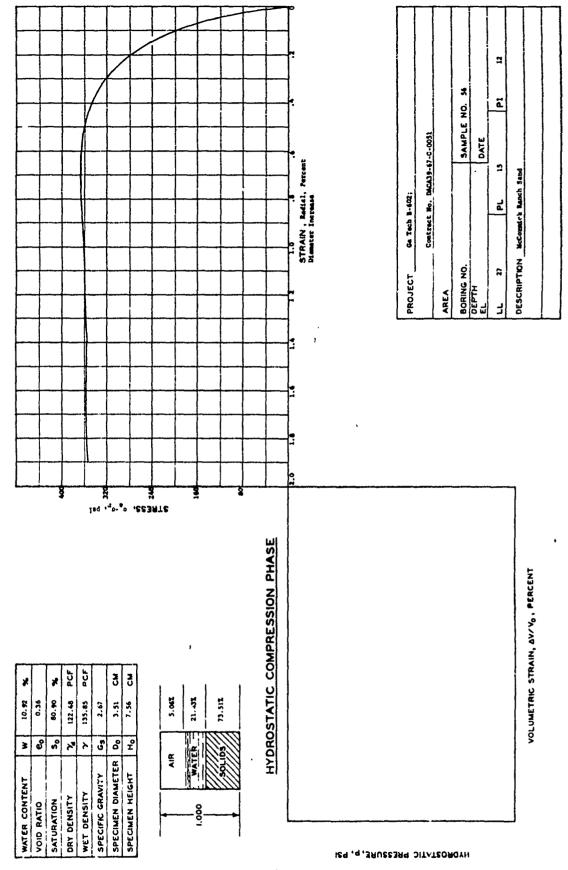


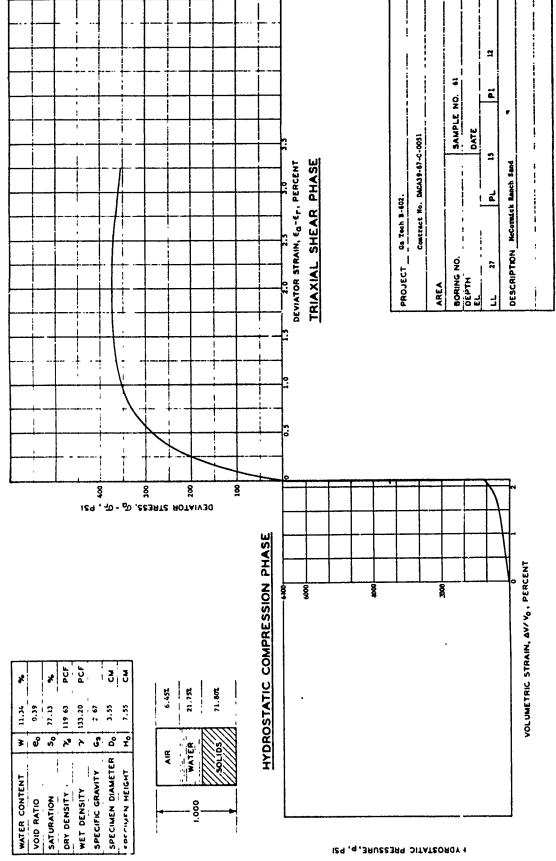


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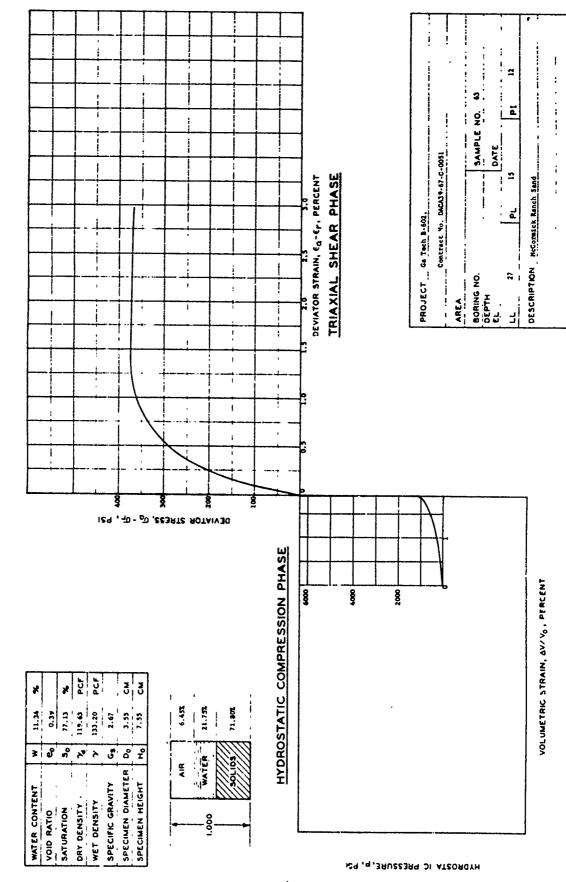


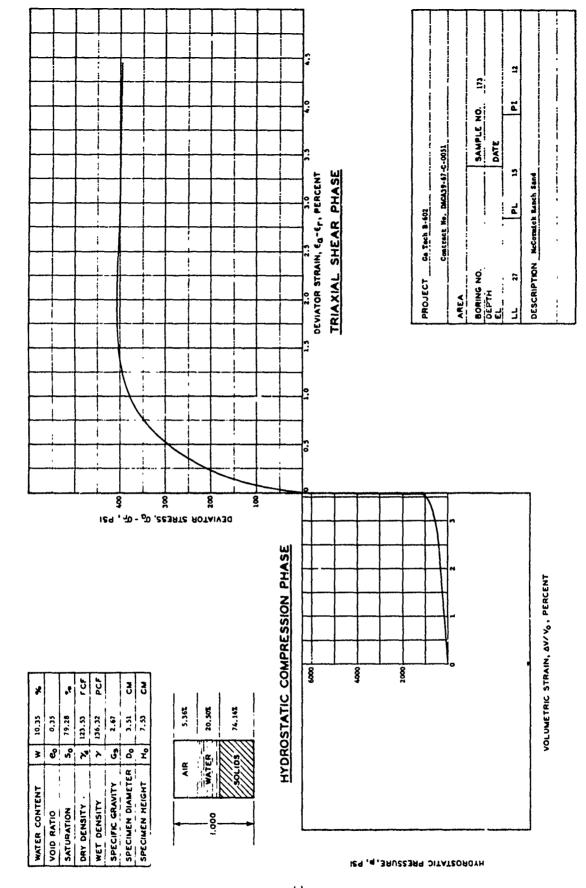


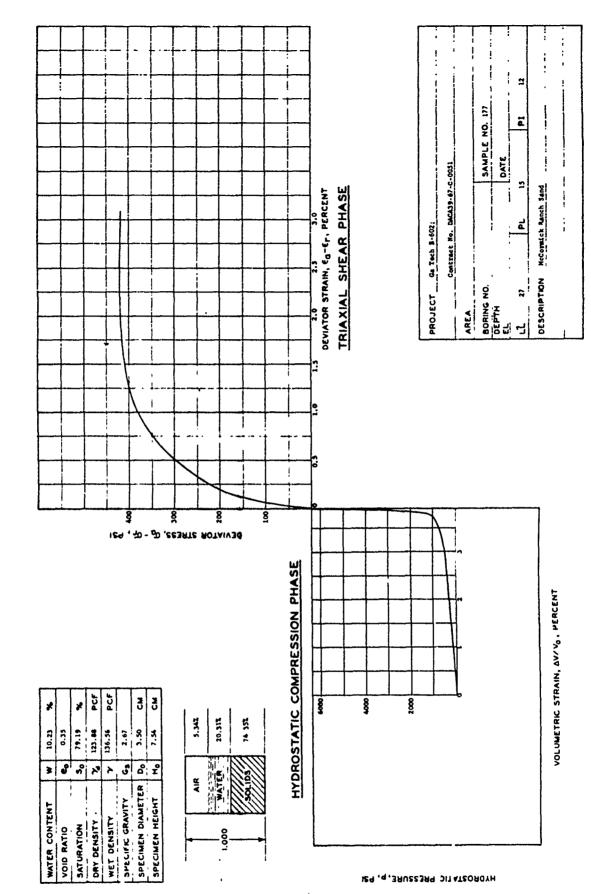
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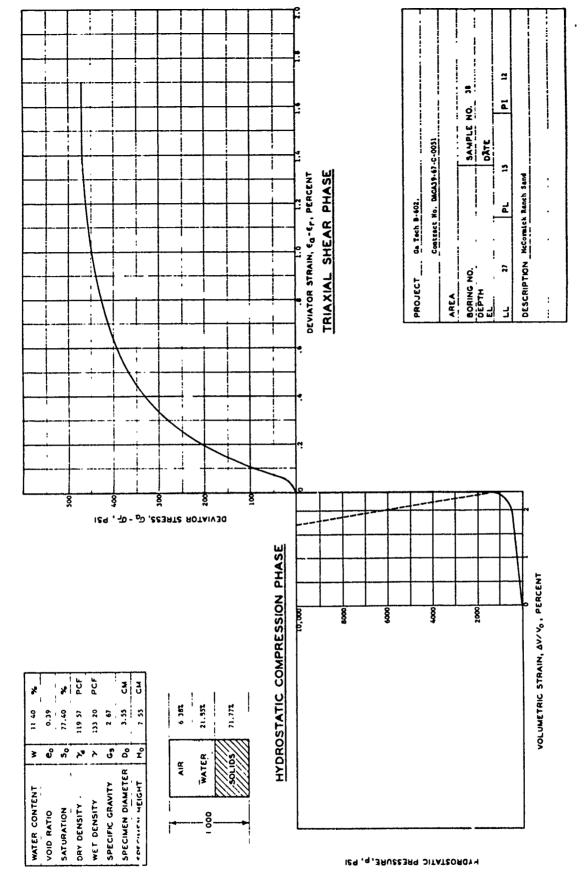
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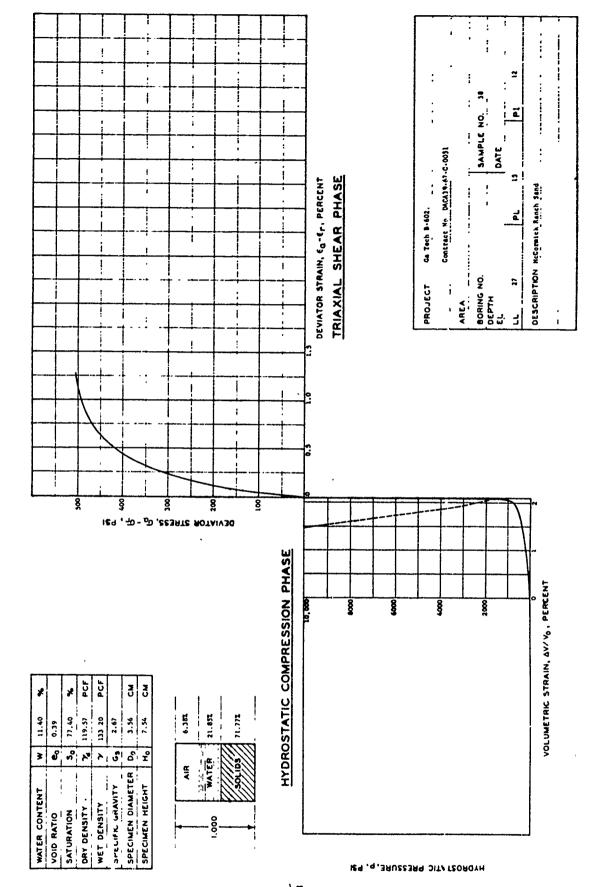




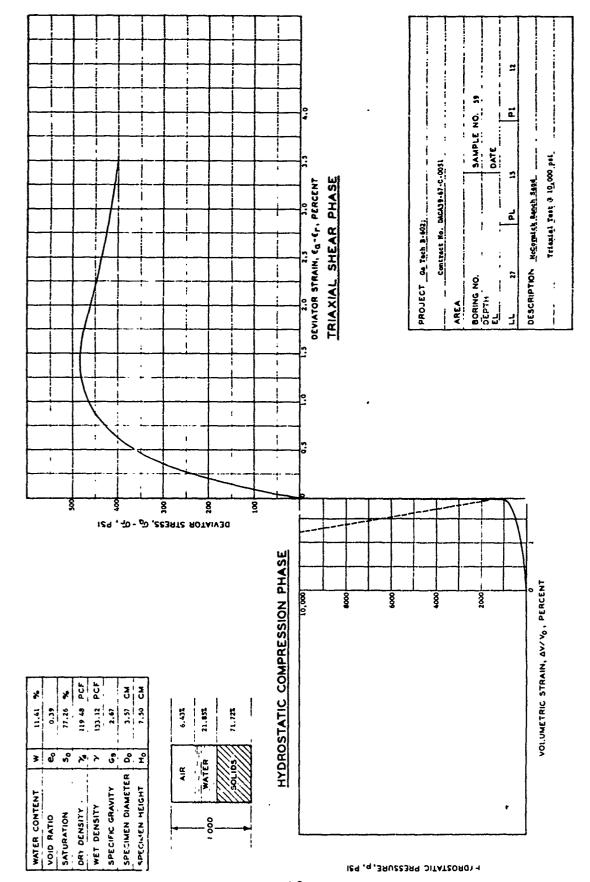


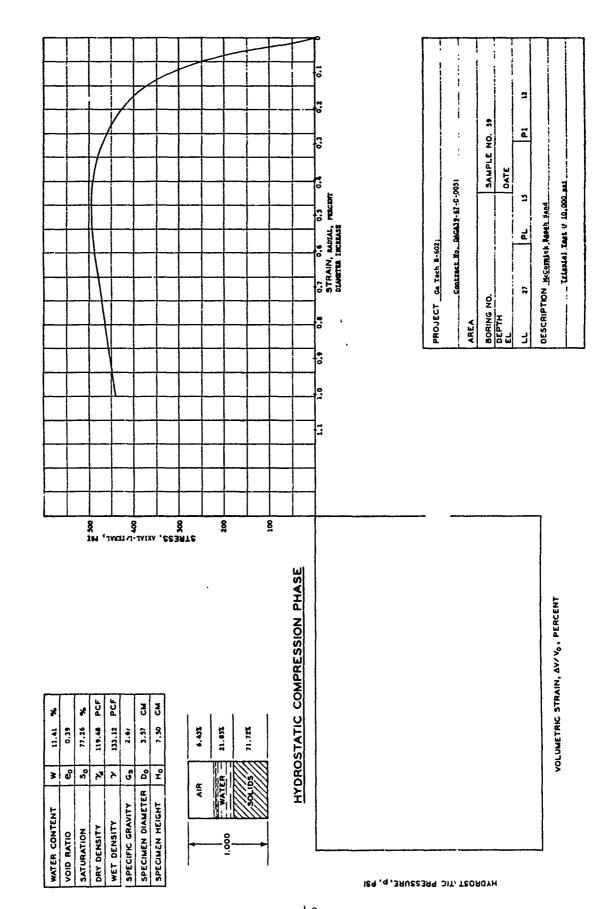
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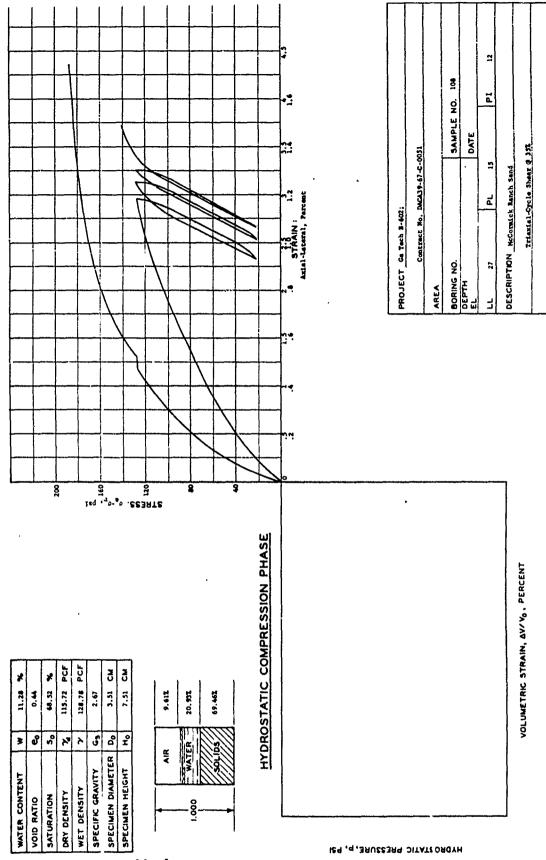




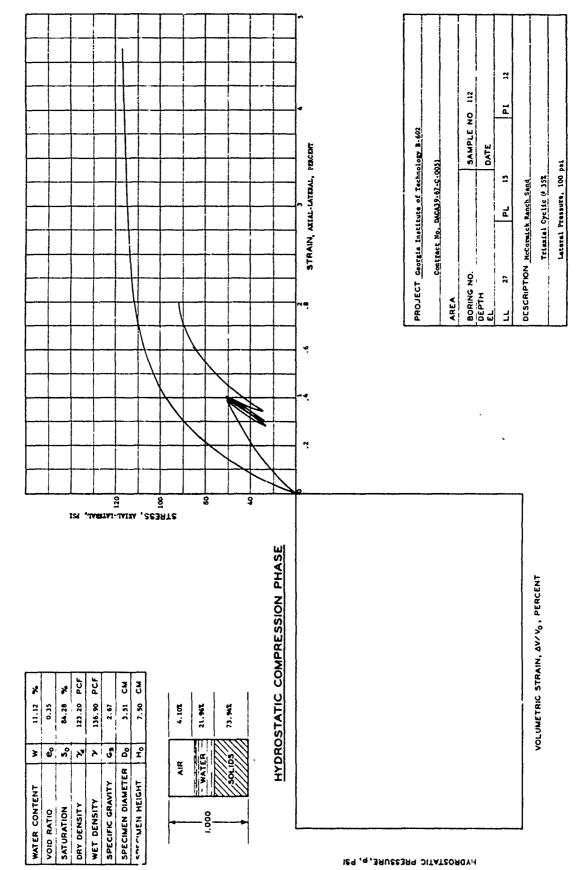
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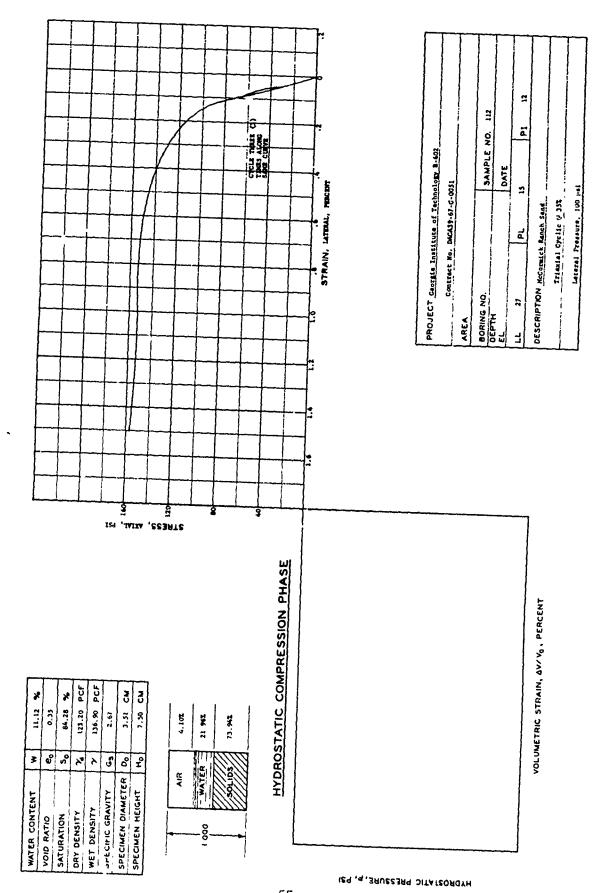
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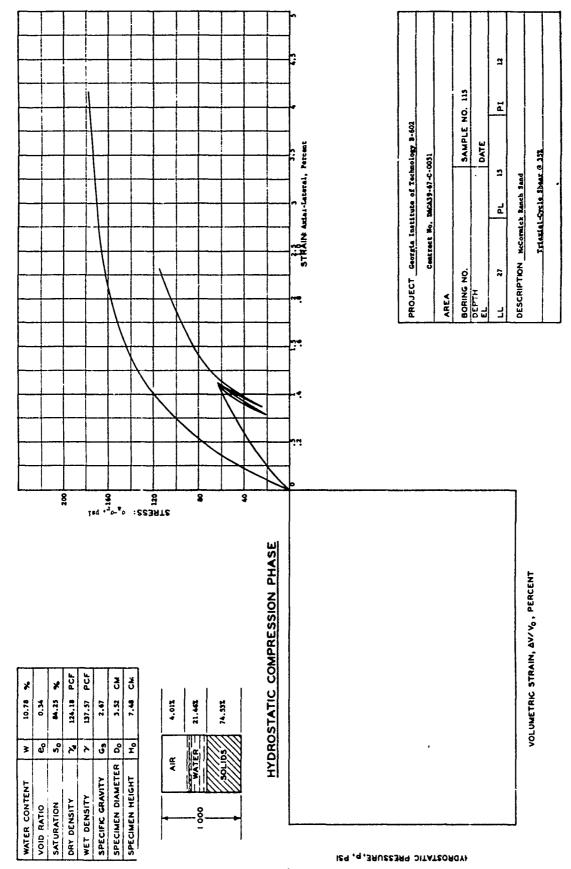


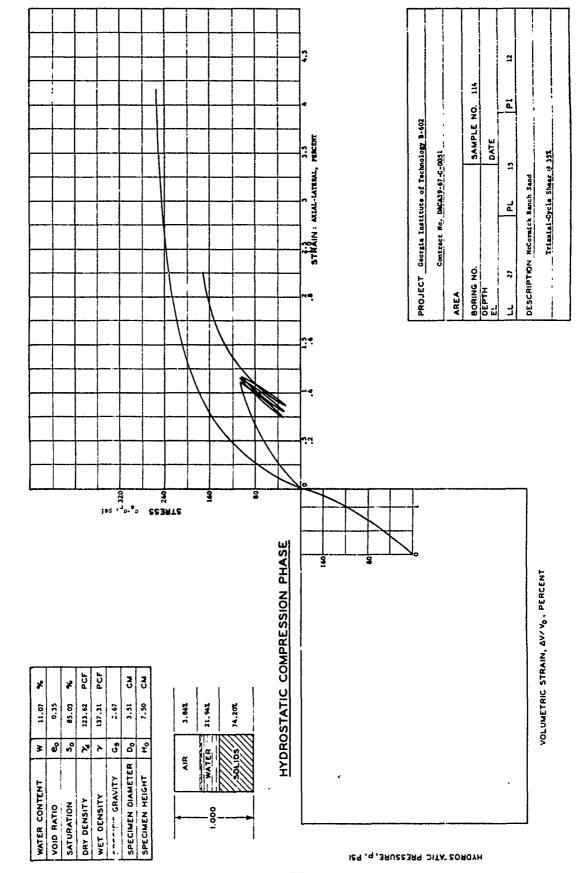
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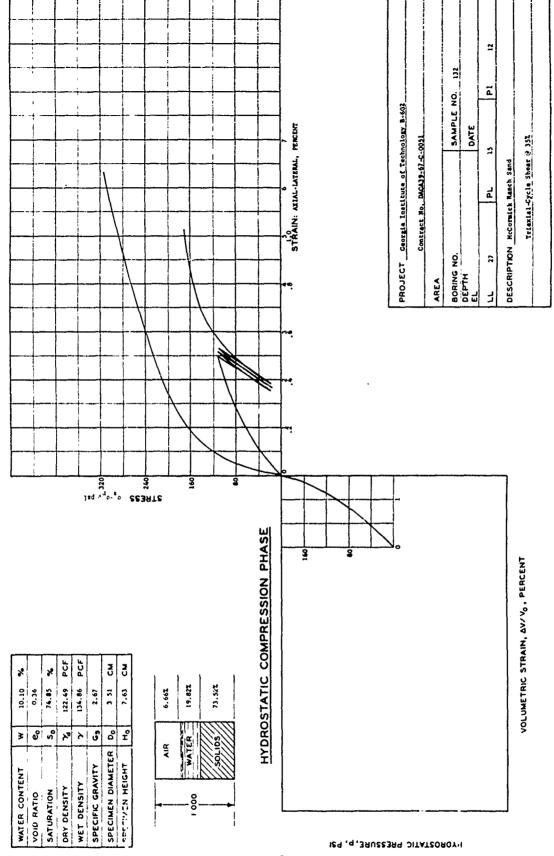
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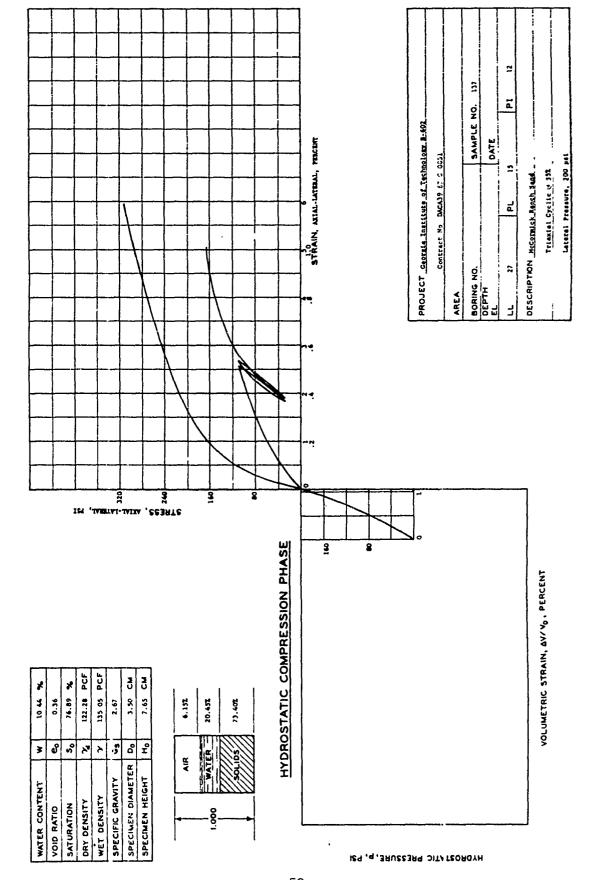


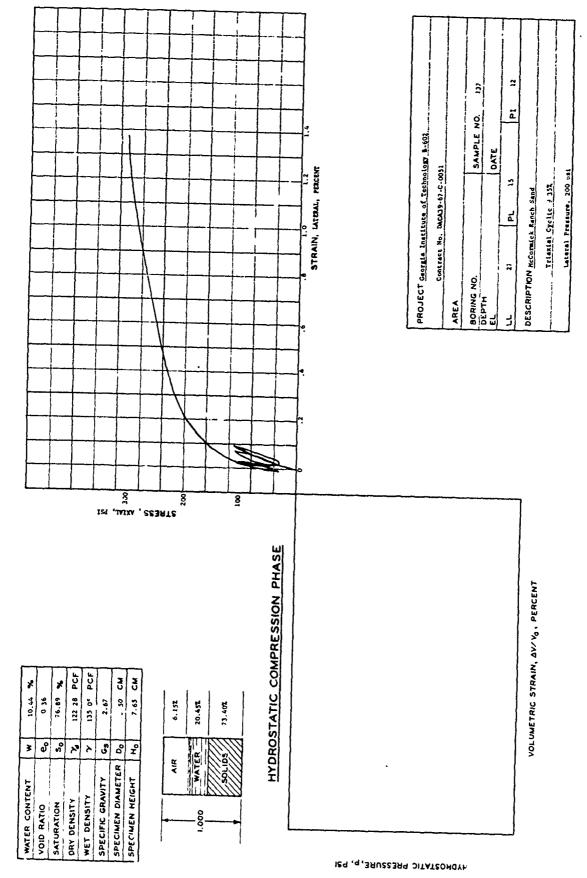


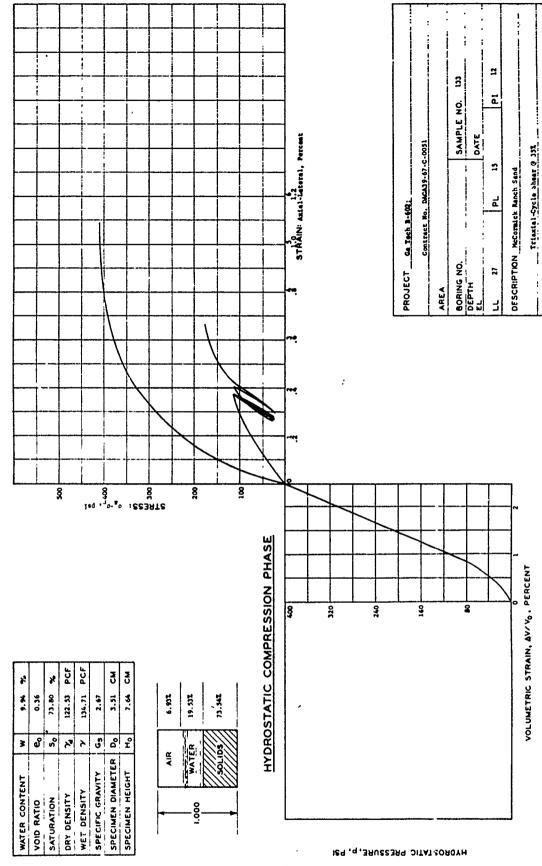


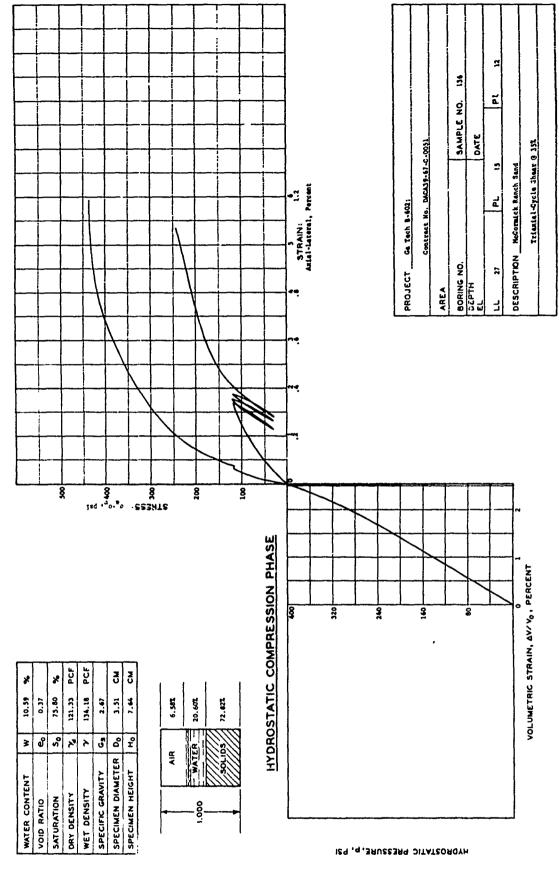
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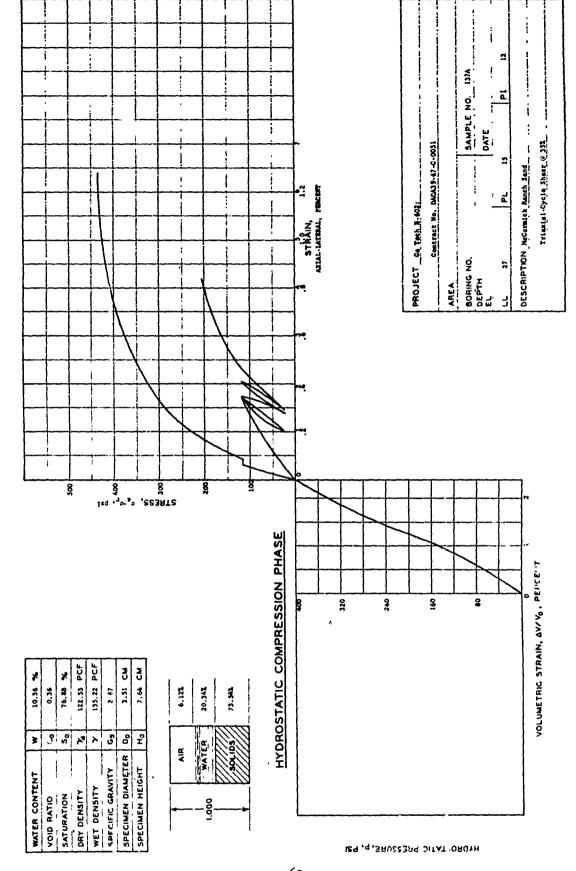




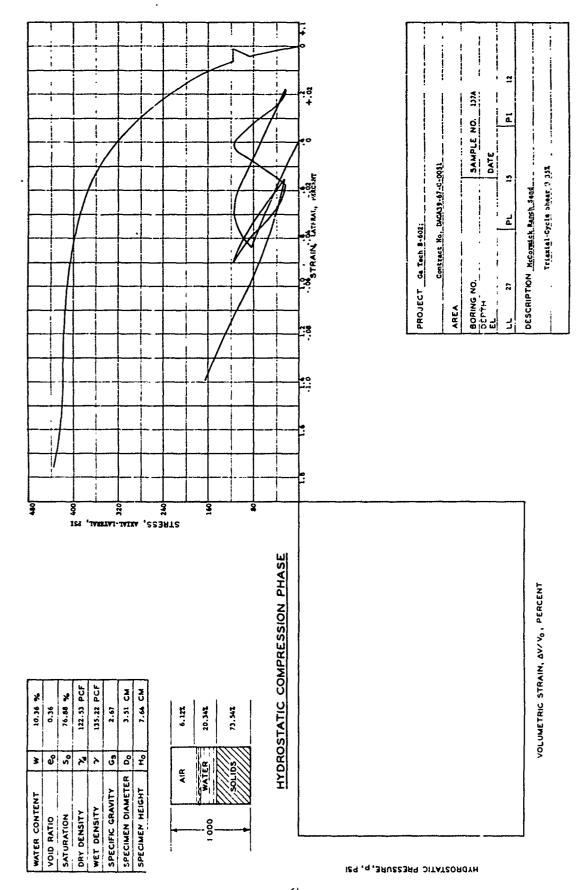


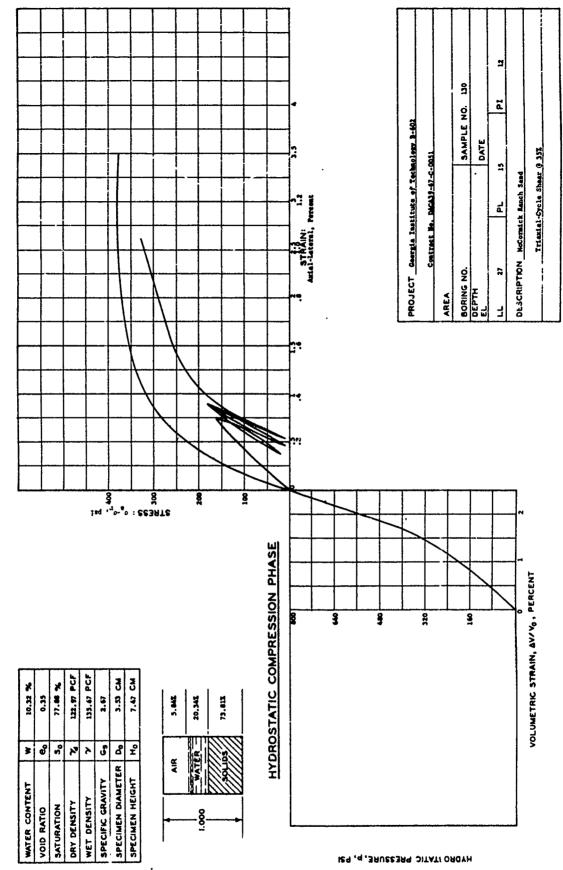


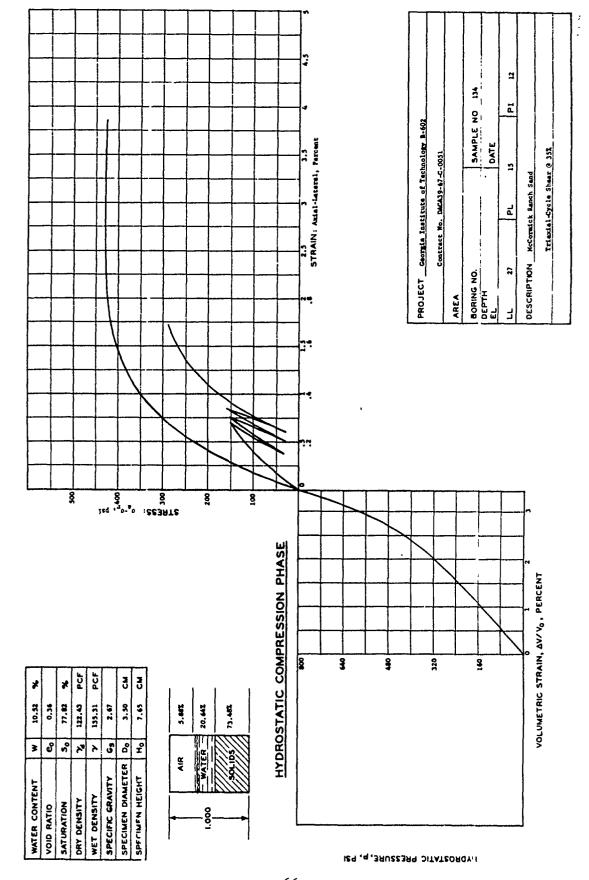
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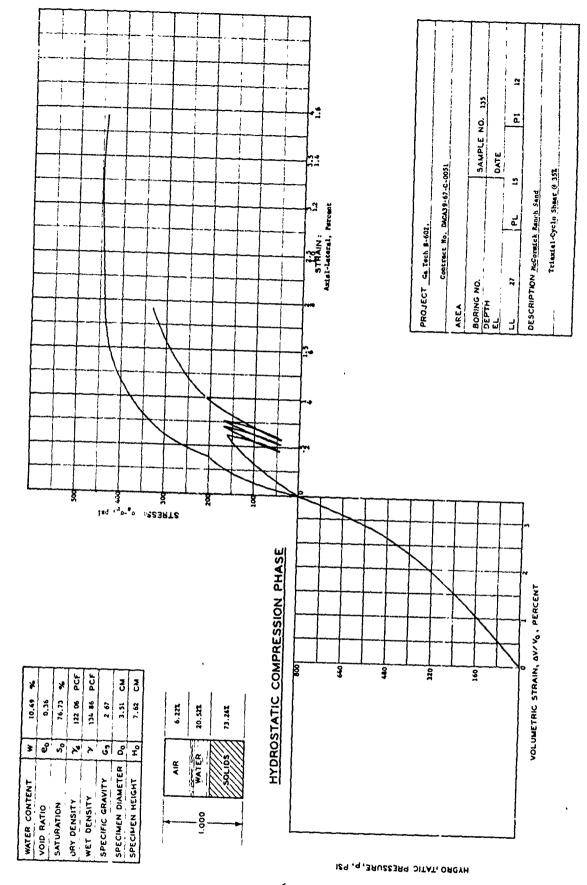


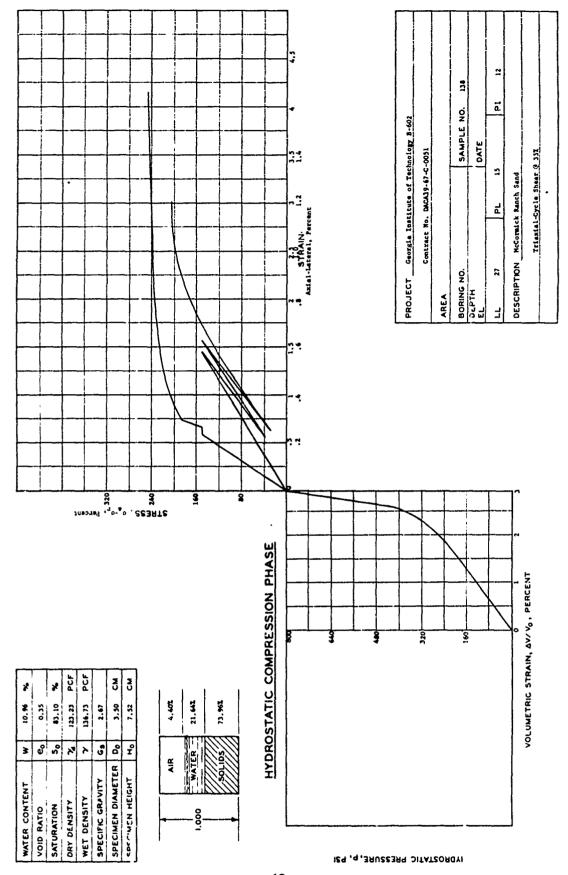
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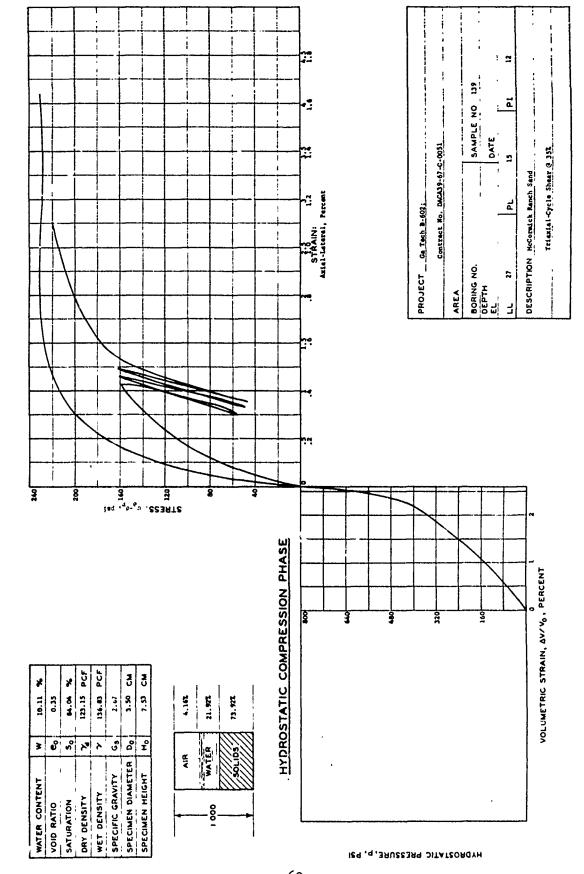


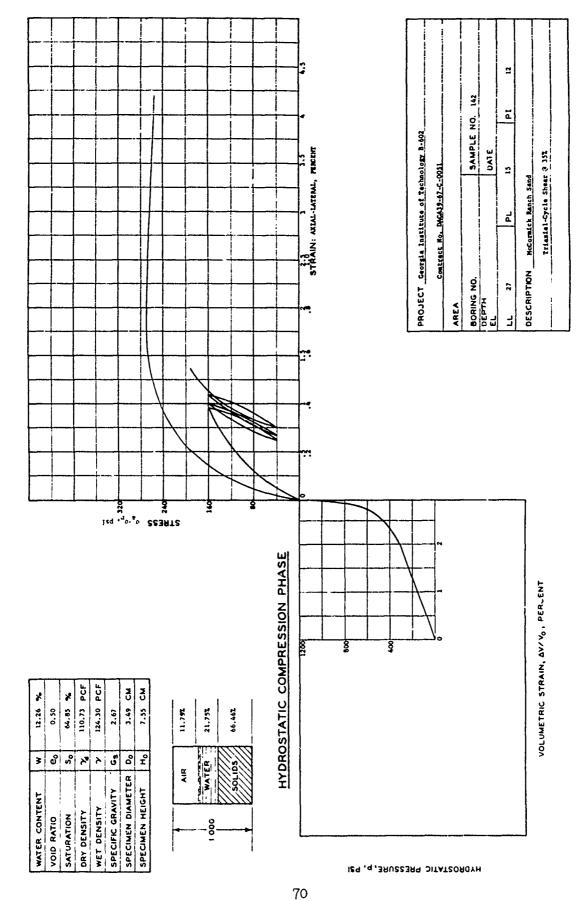


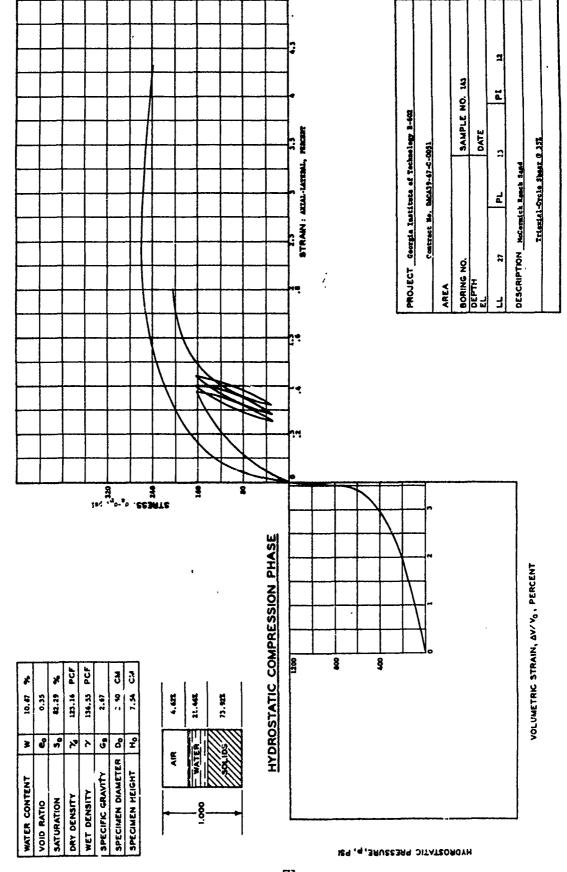


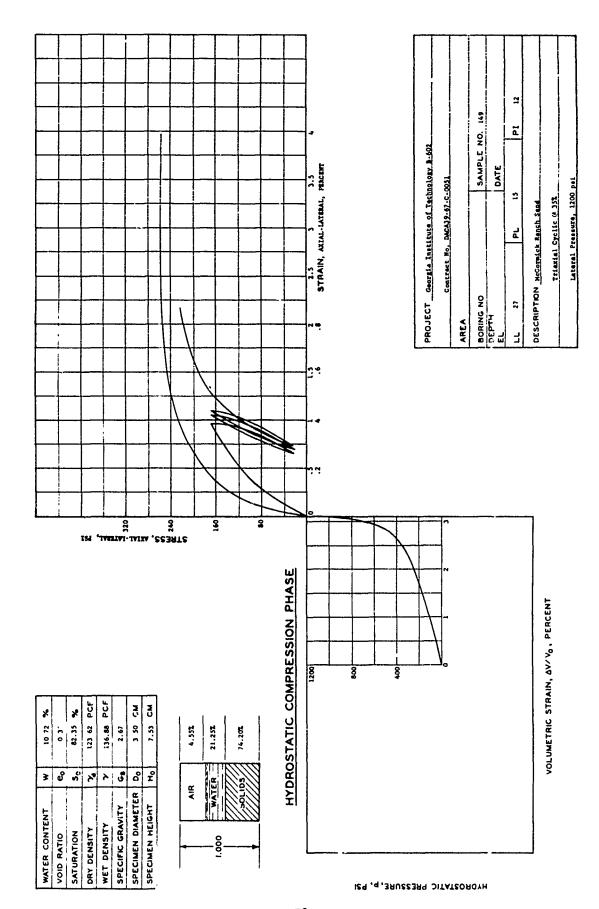


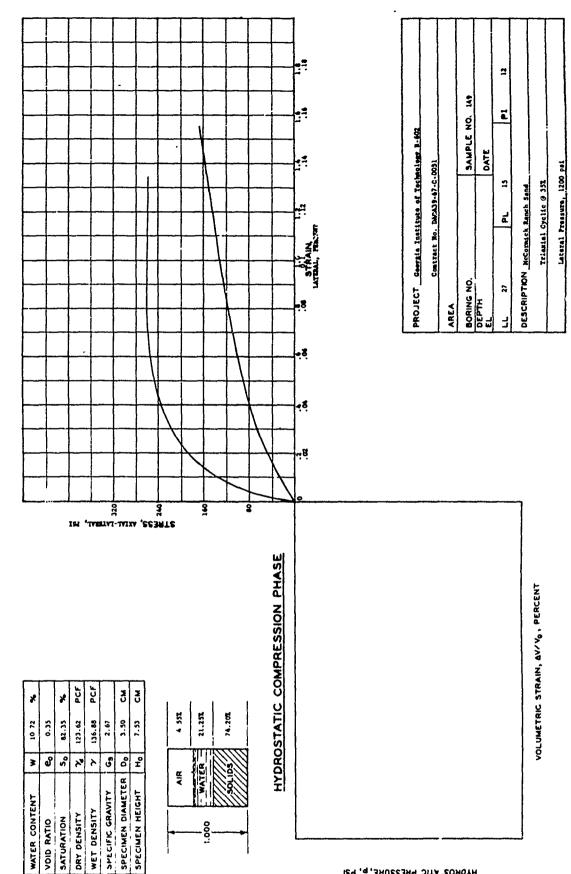




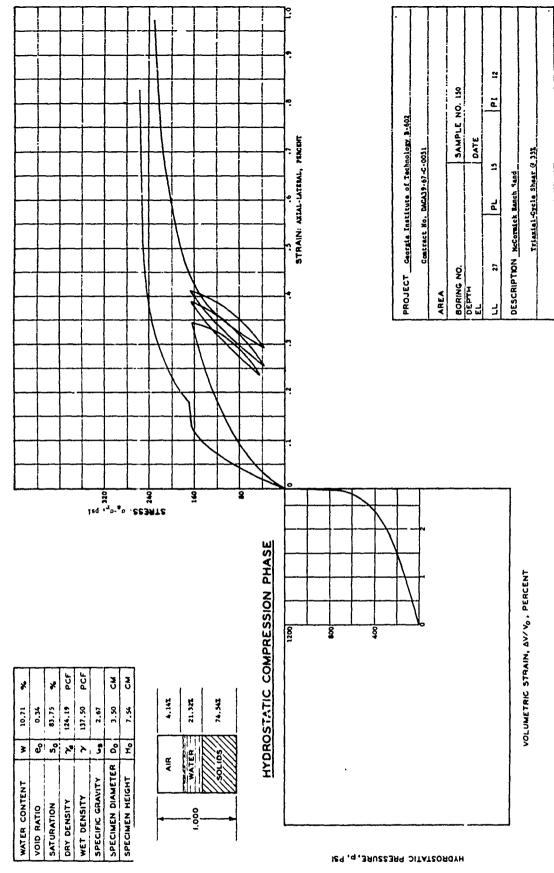


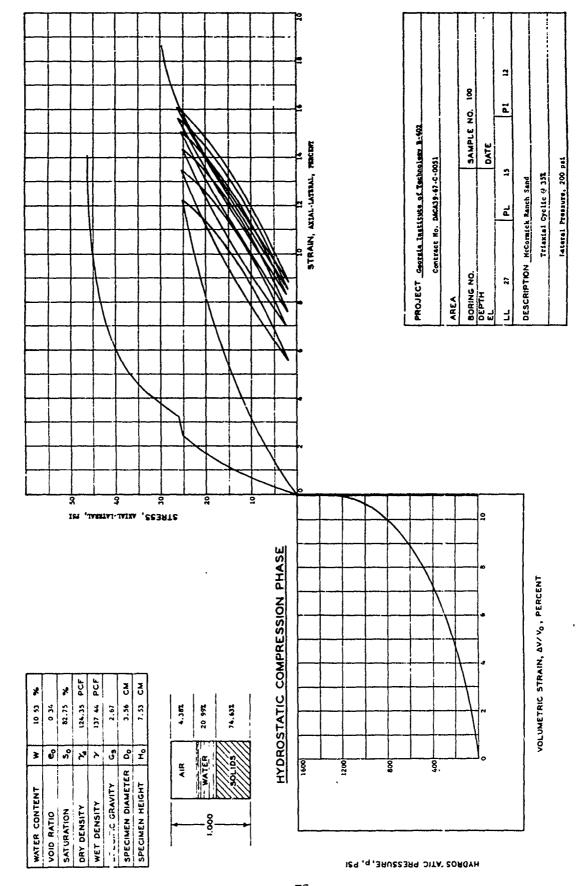


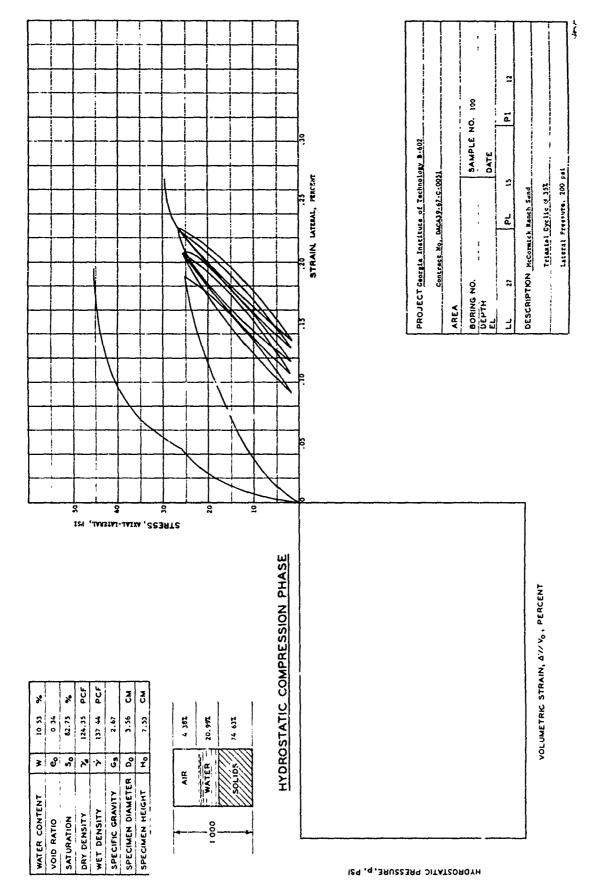


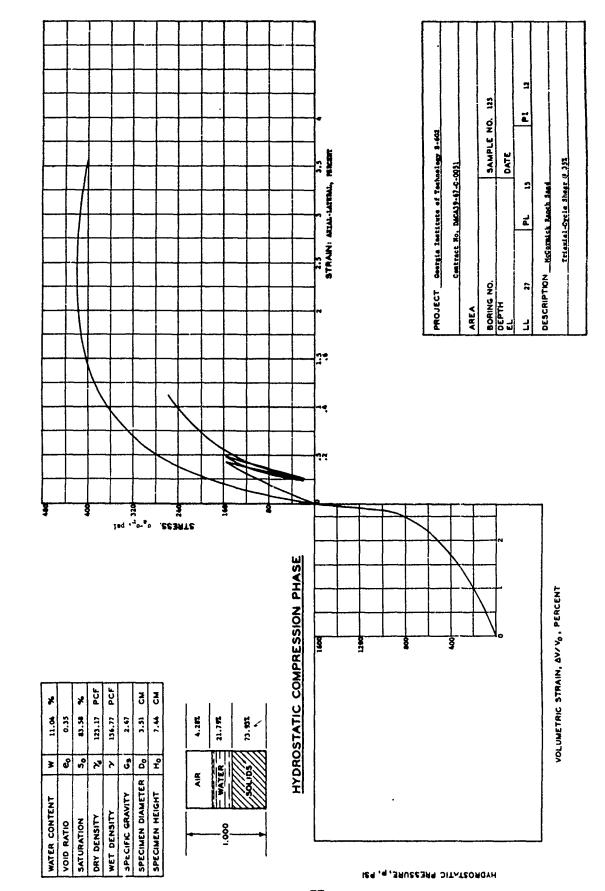


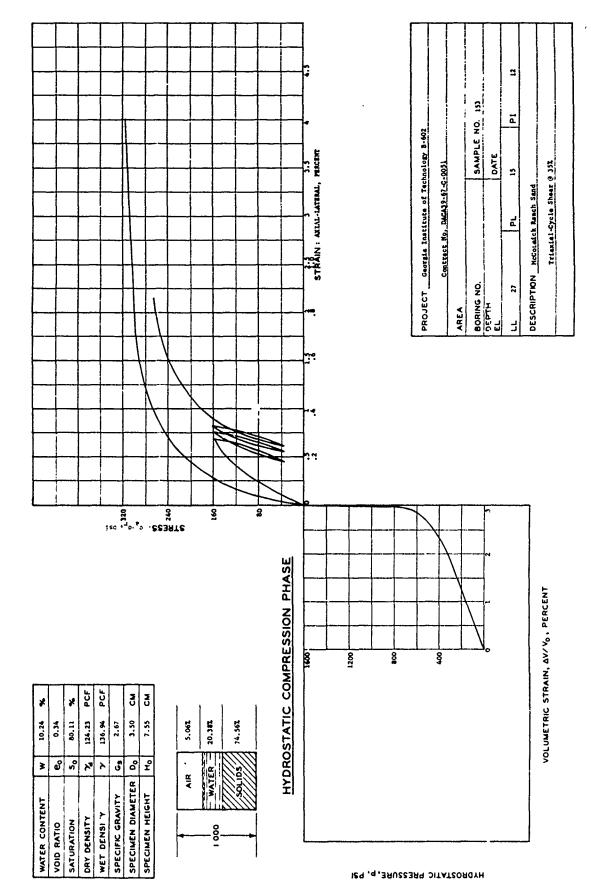
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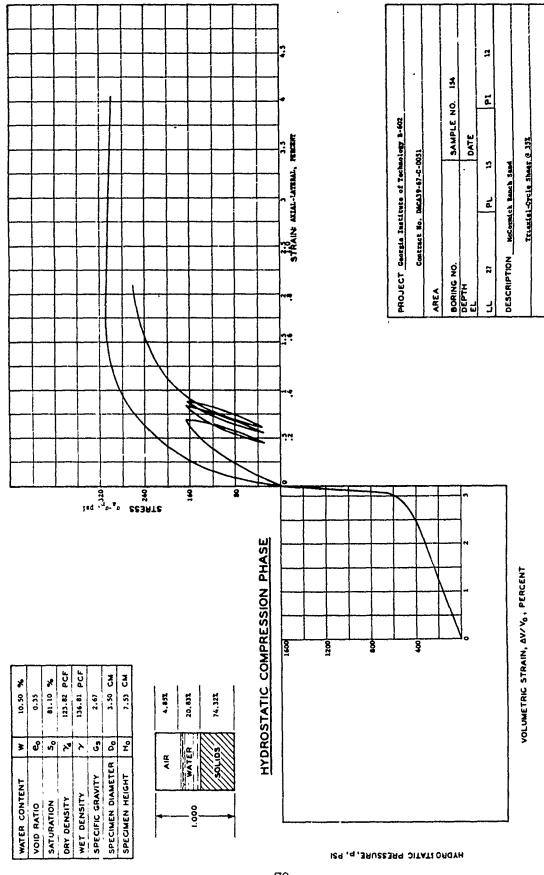


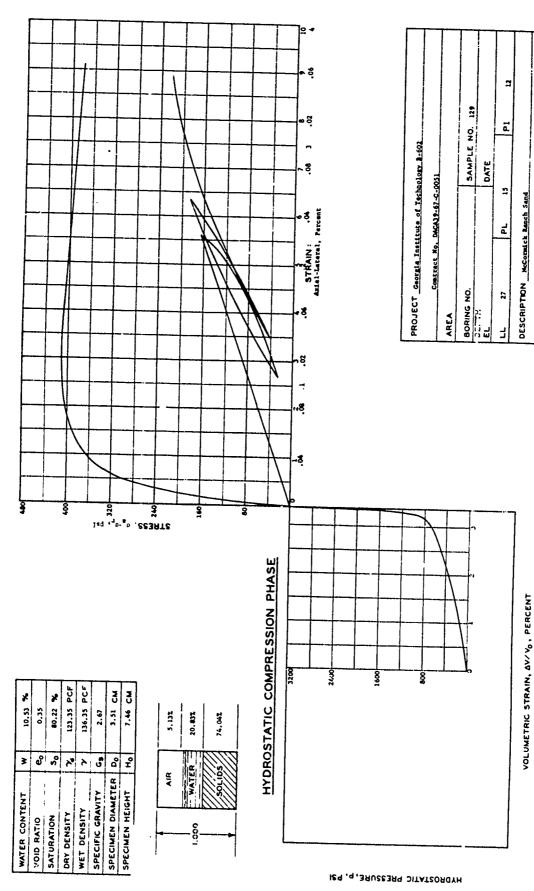




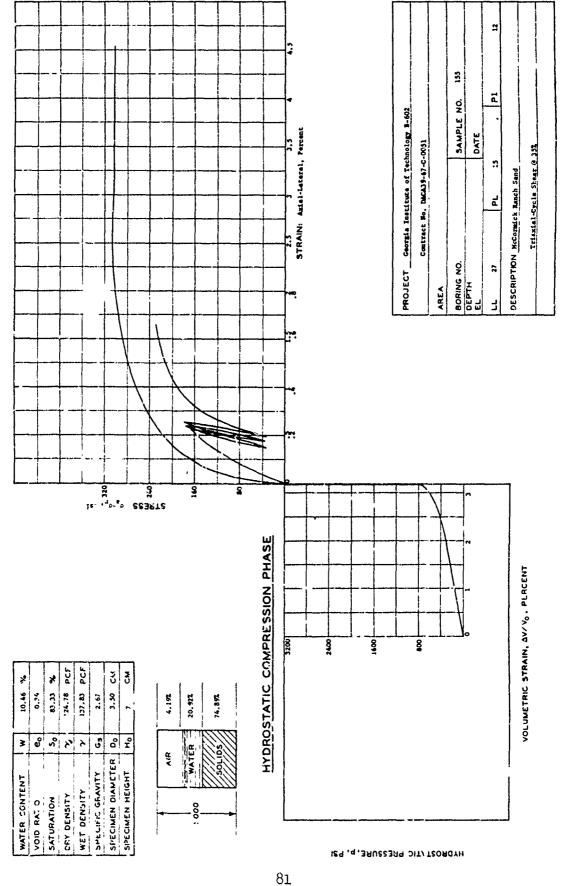




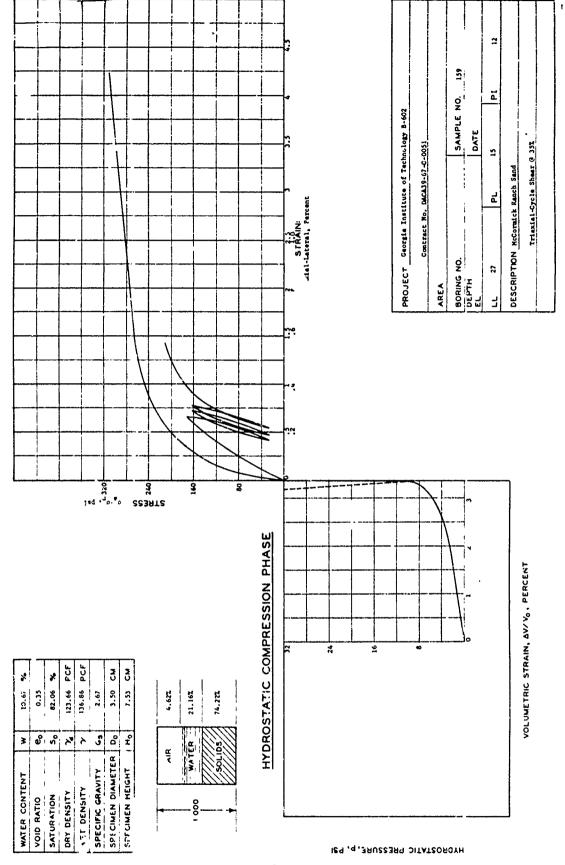


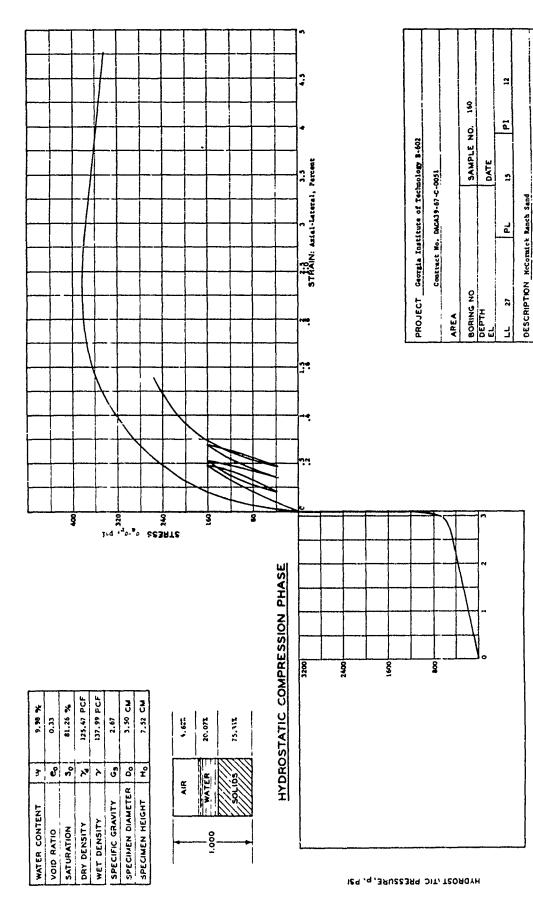


Triental-Cycle Shear @ 35%



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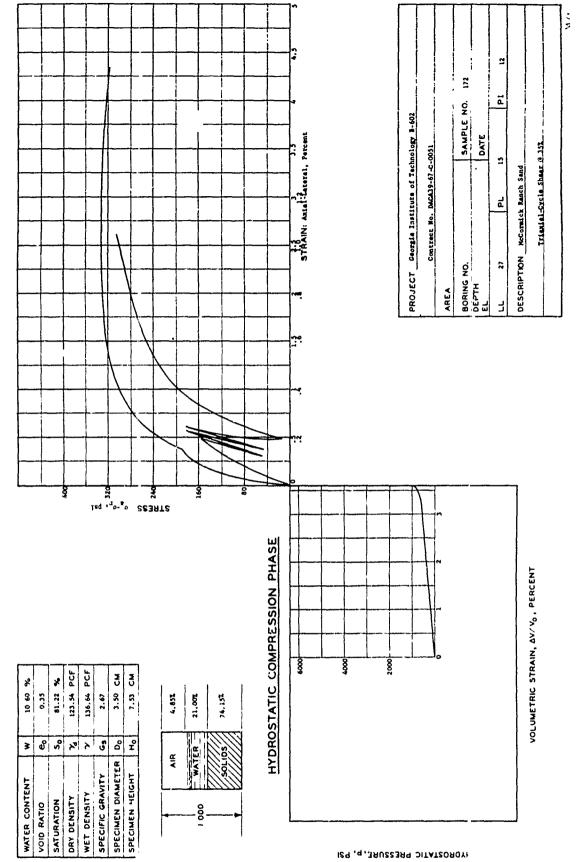


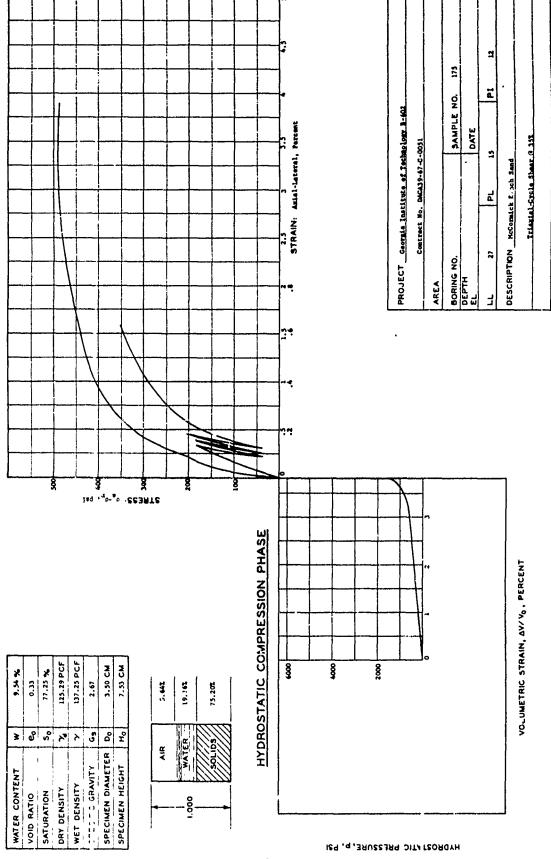
TECHNICAL CONTRACTOR (SECONDARY)

Triaxial-Cycle Shear @ 35%

VOLUMETRIC STRAIN, AV/ Vo., PERCENT

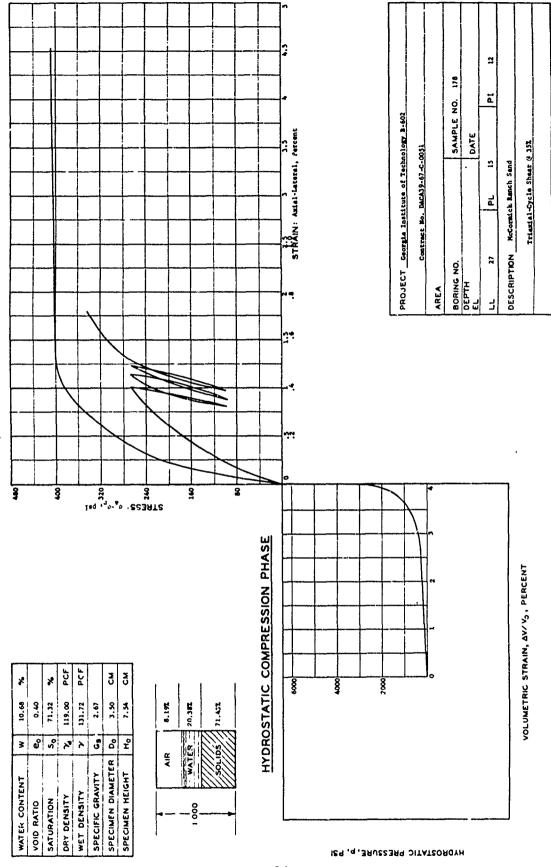
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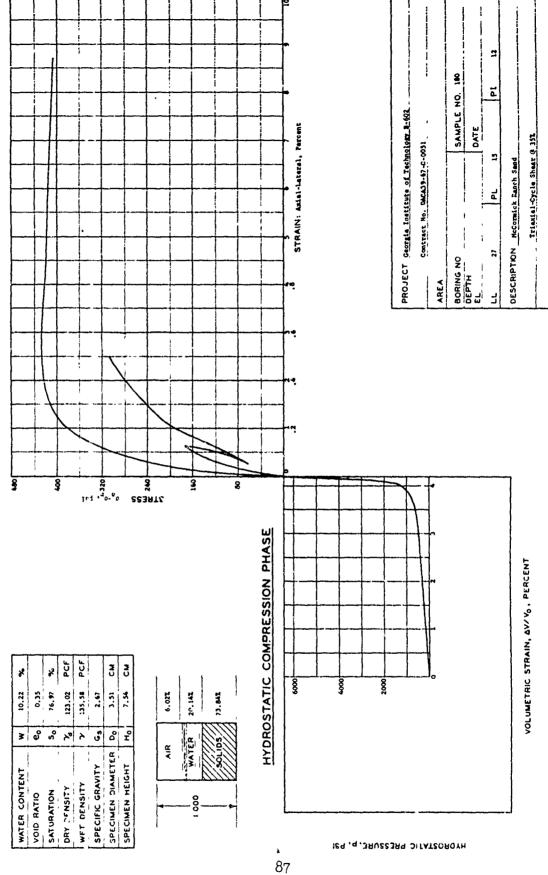




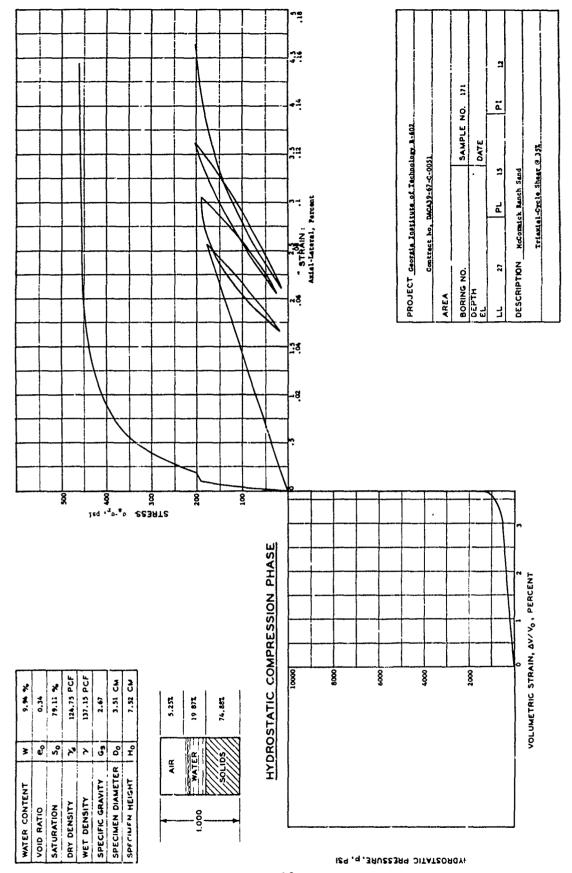
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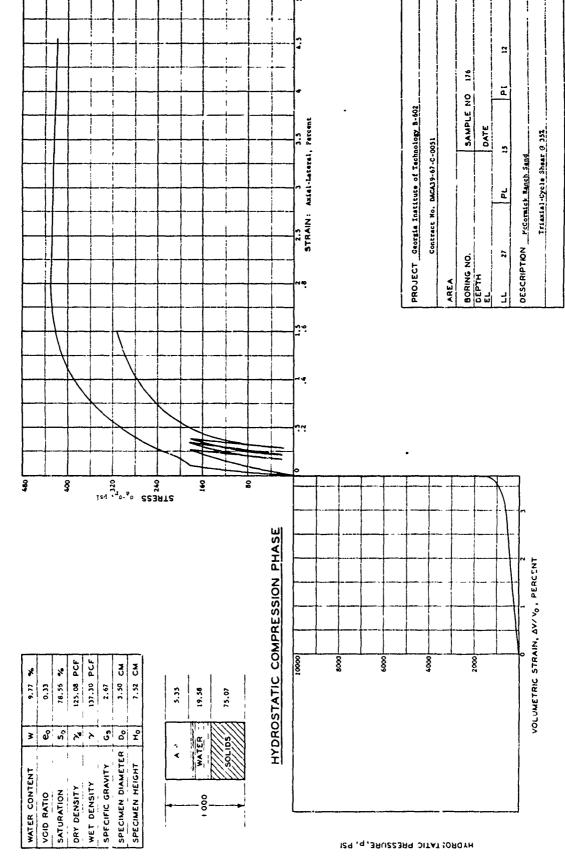
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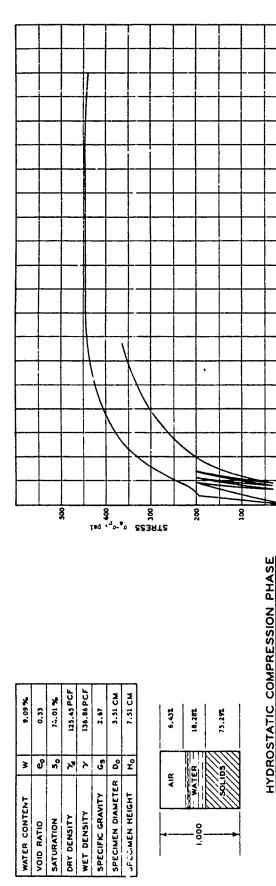




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HYDROSTATIC PRESSURE, p., PSI

PROJECT Georgia Institute of Technology 3-602

AREA

BORING NO.

Contract No. McA39-67-6-0051

SAMPLE NO. 179

DEPTH

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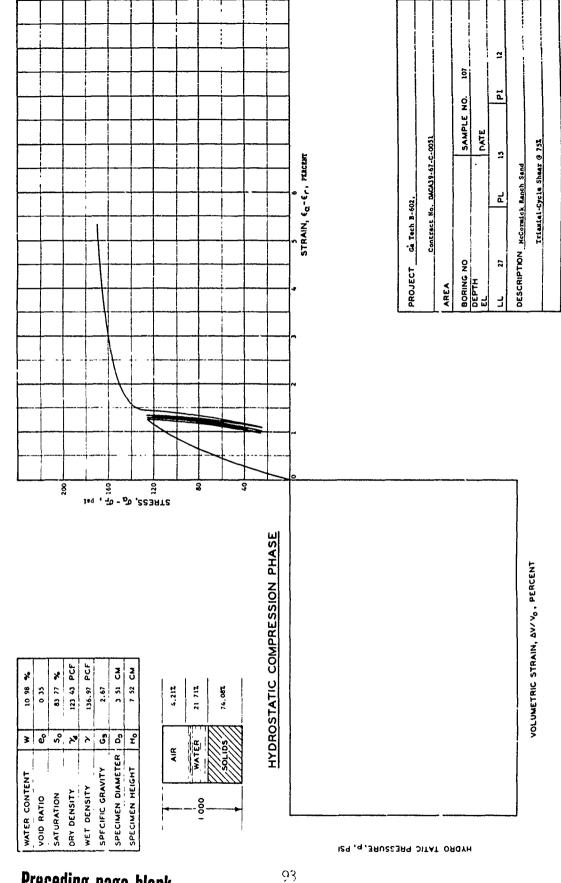
DESCRIPTION McCoratck Ranch Sand

Tritexial-Cycle Shear @ 352

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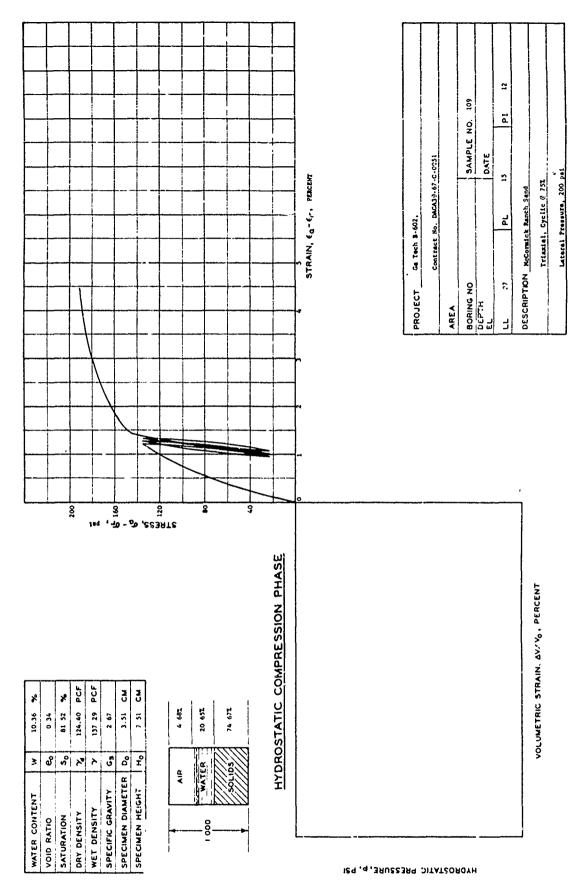
2.5 3 3.5 STRAIN: Axial-Lateral, Percent Group C

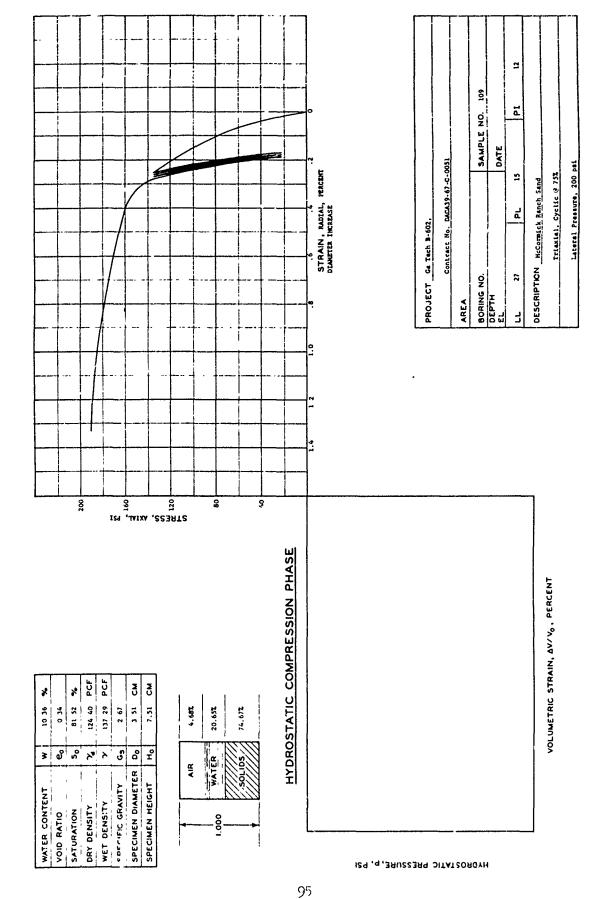
Triaxial Tests, Cyclic at 75%



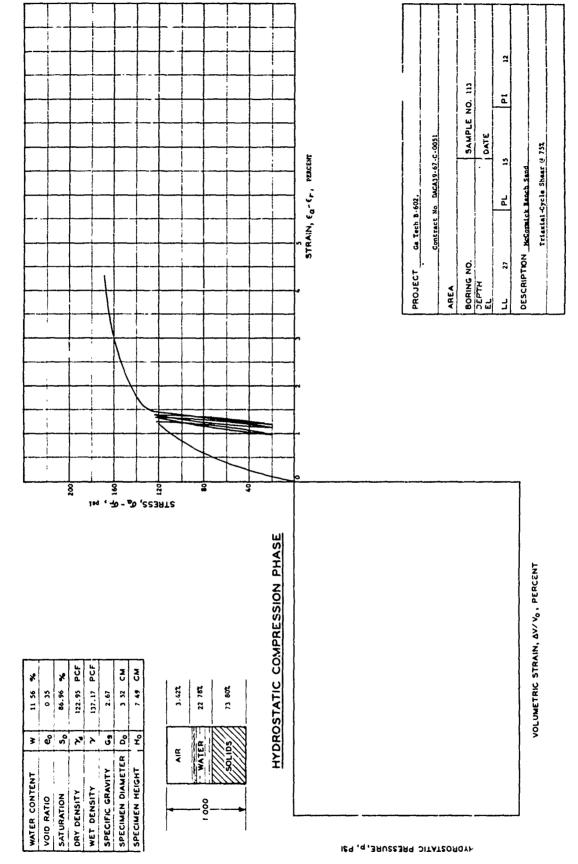
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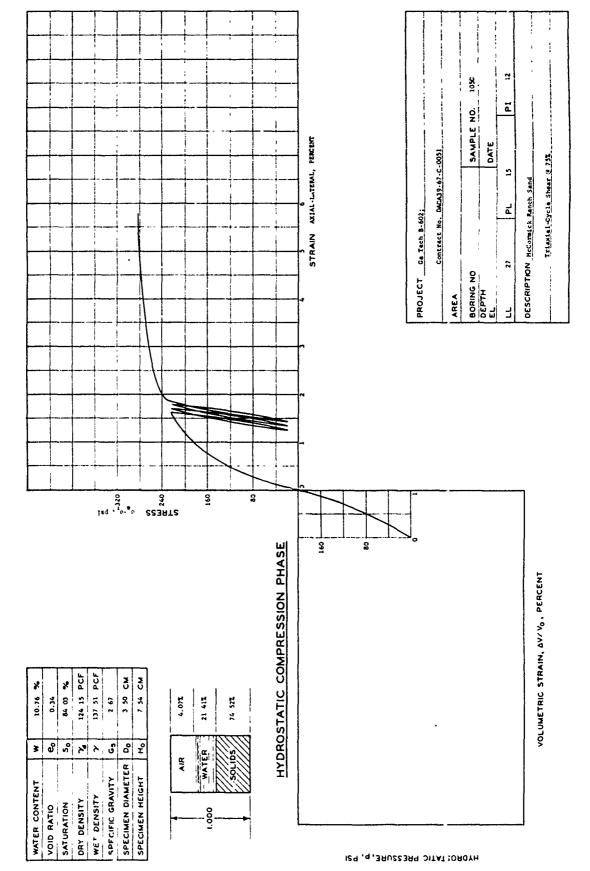




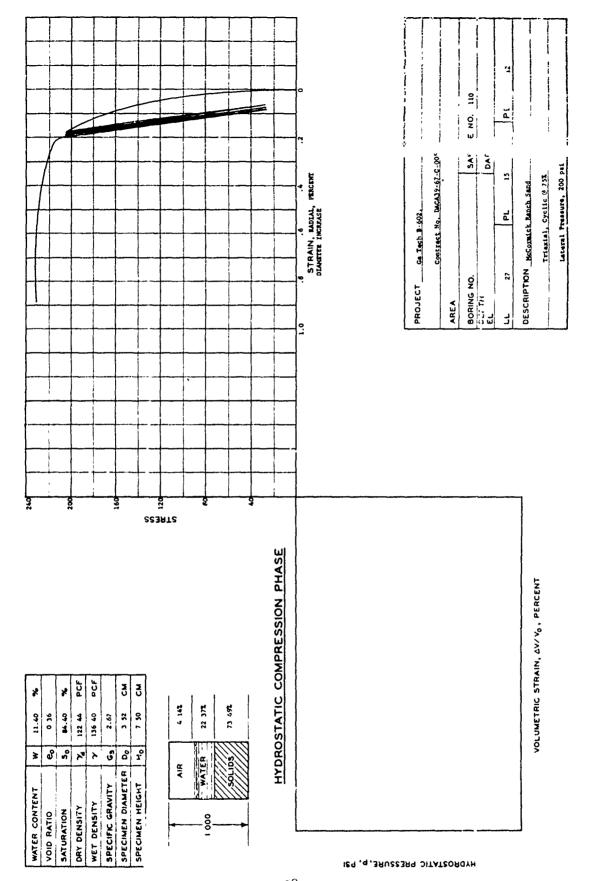
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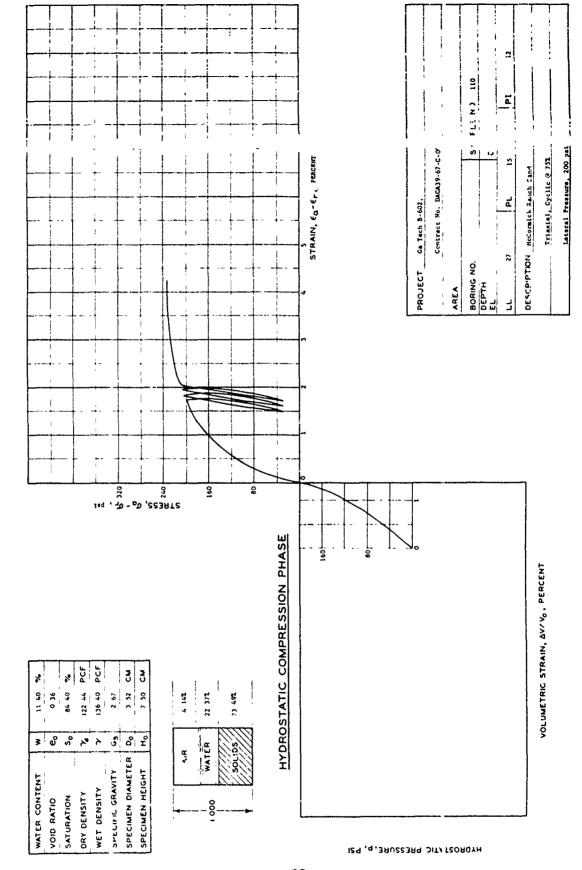


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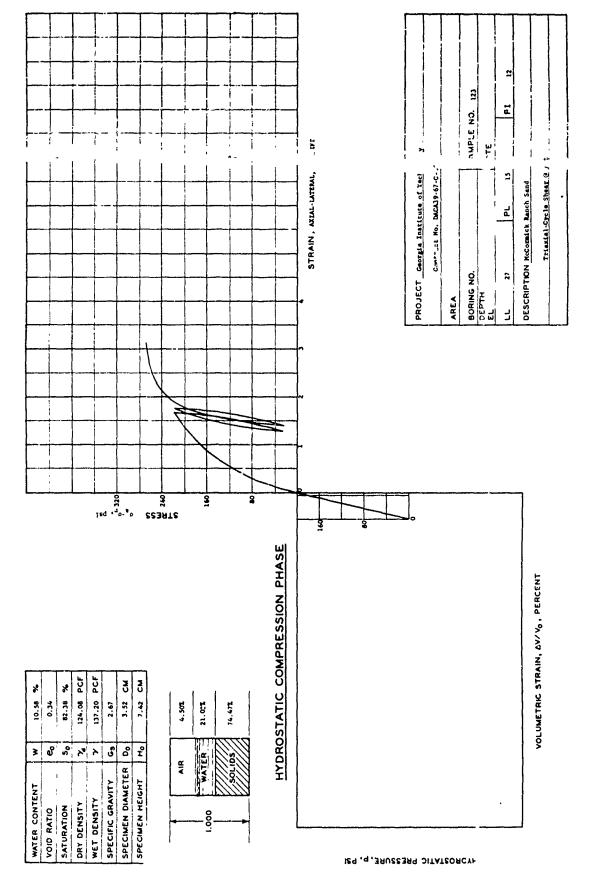


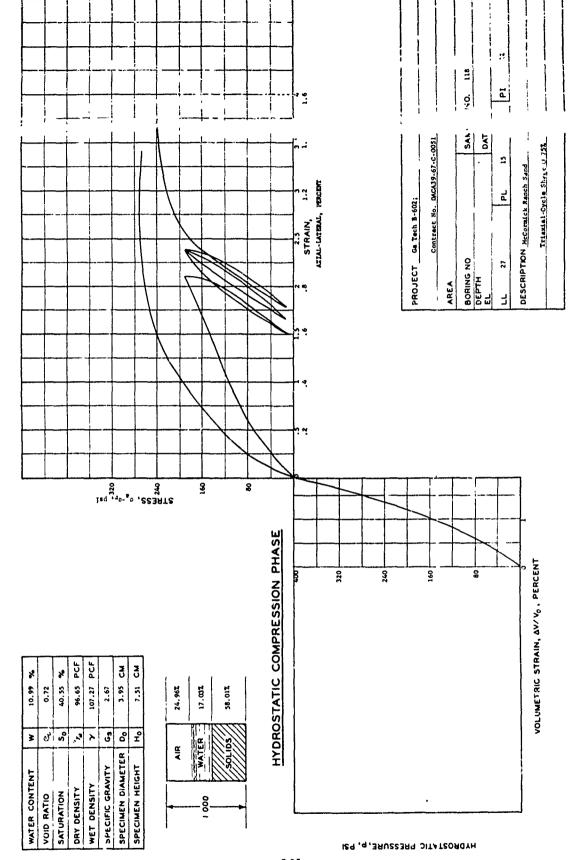
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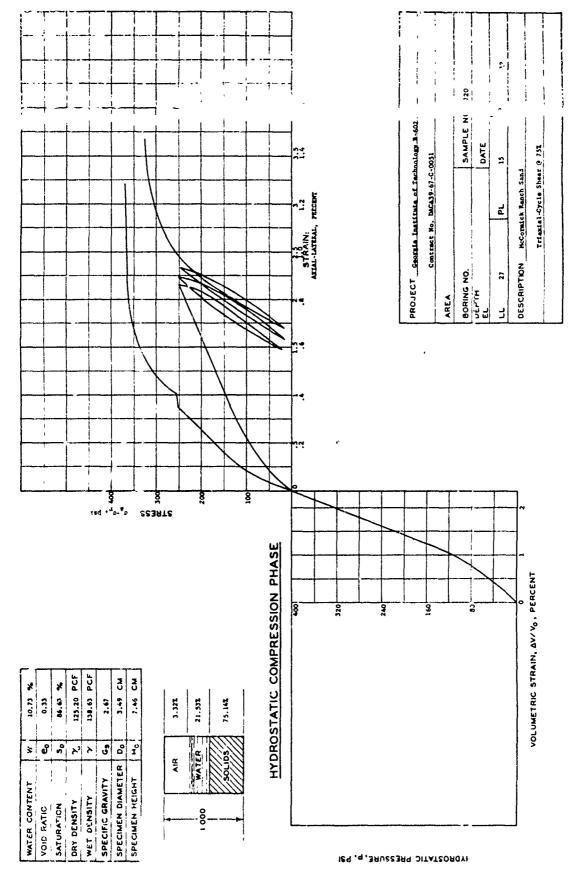


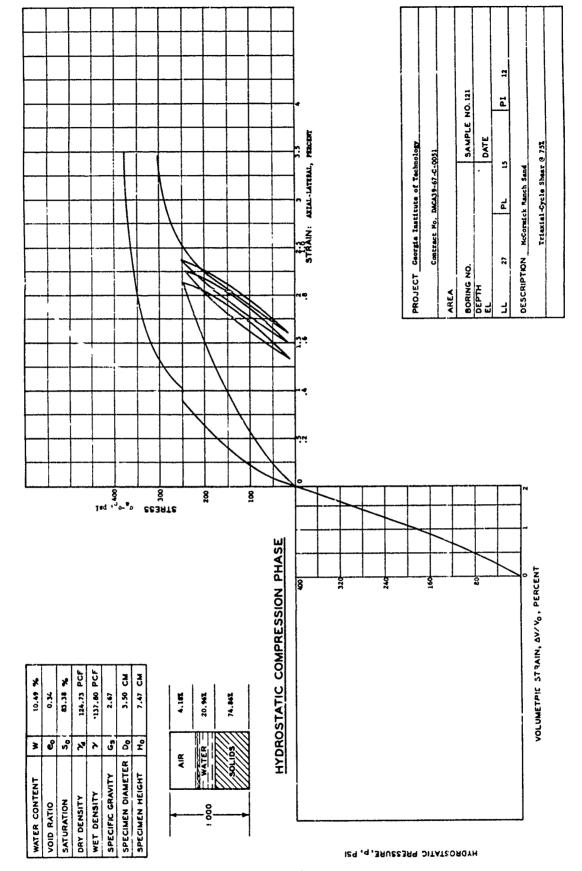
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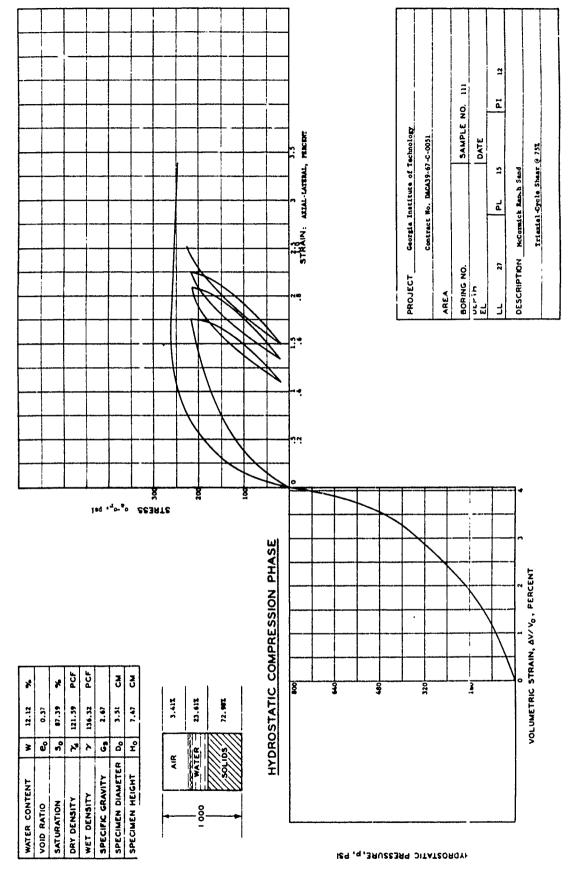
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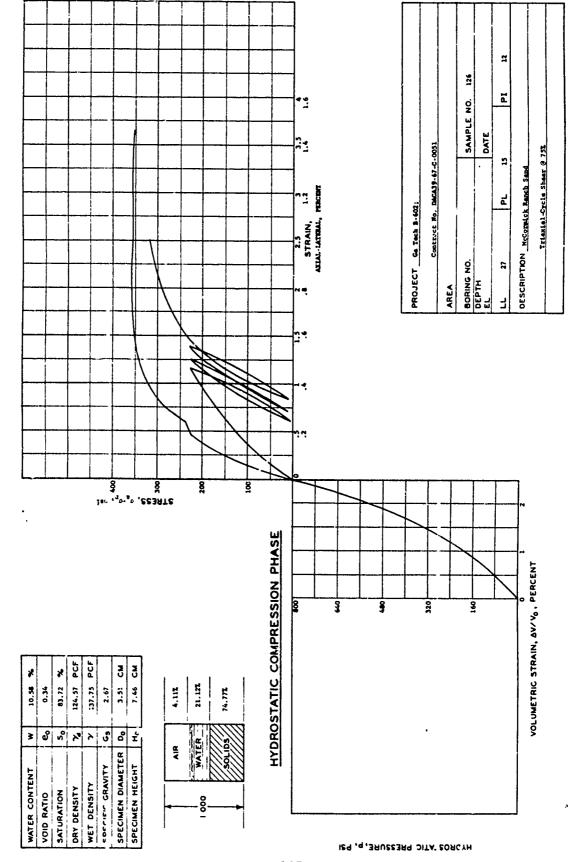




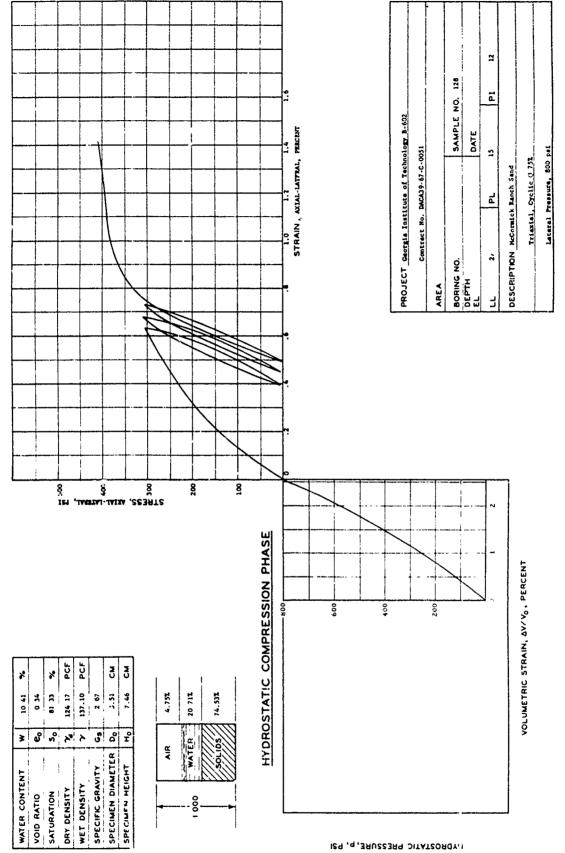
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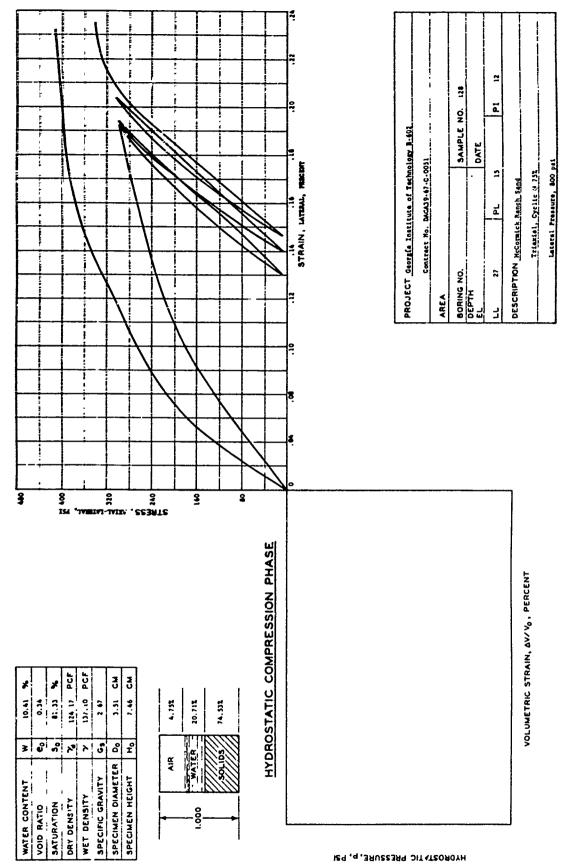
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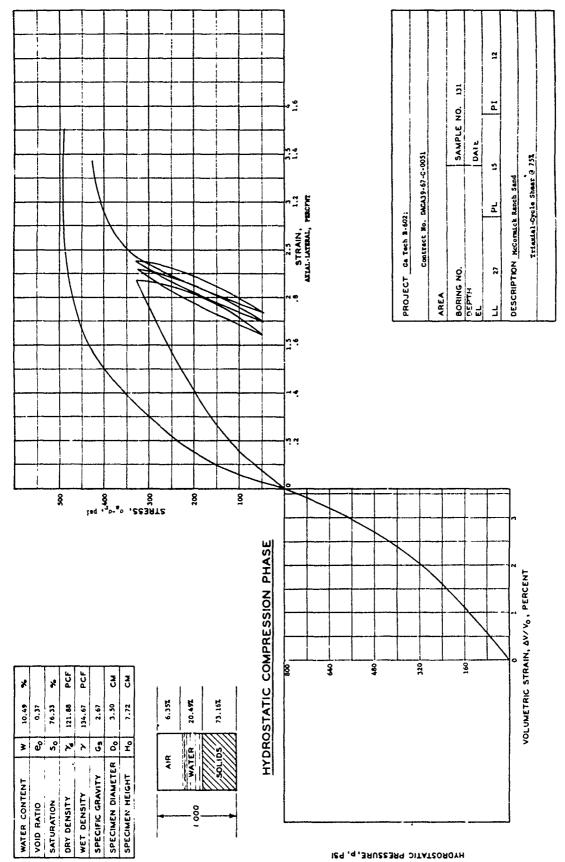


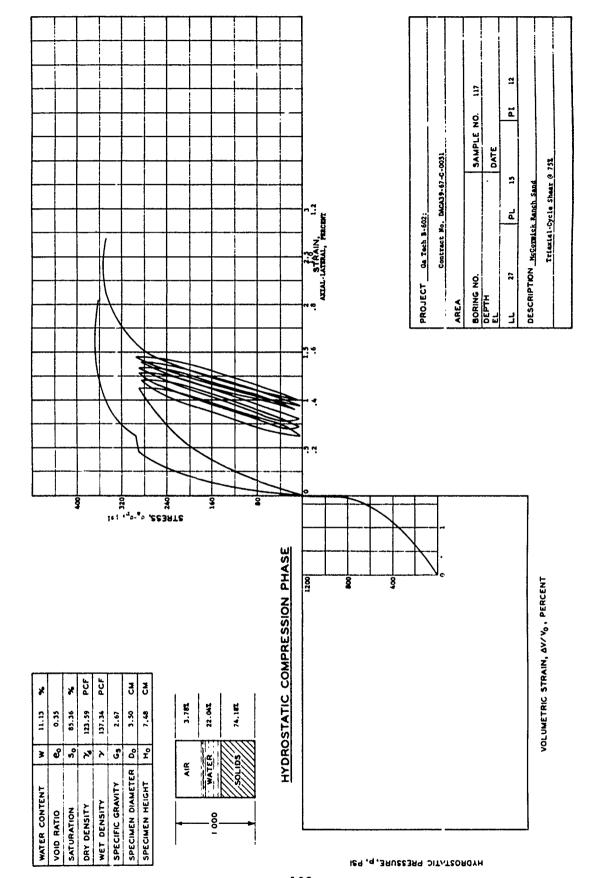
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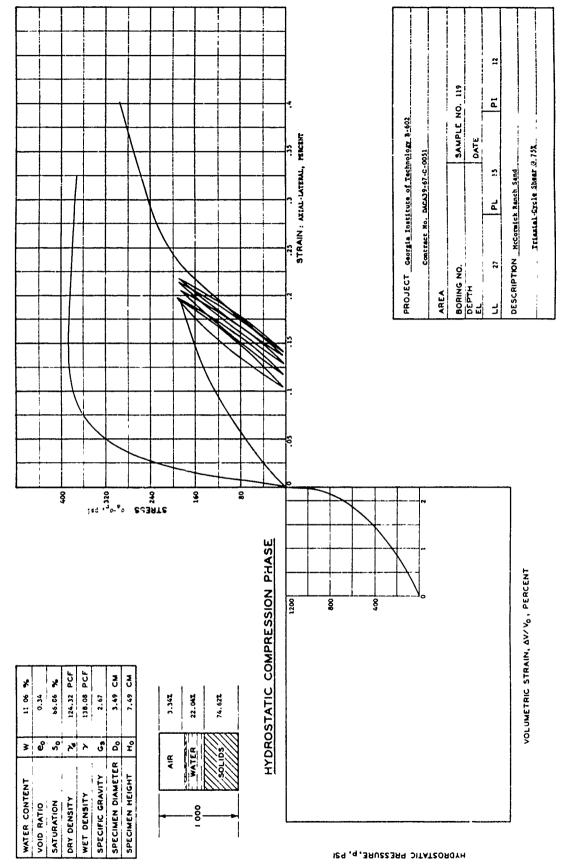
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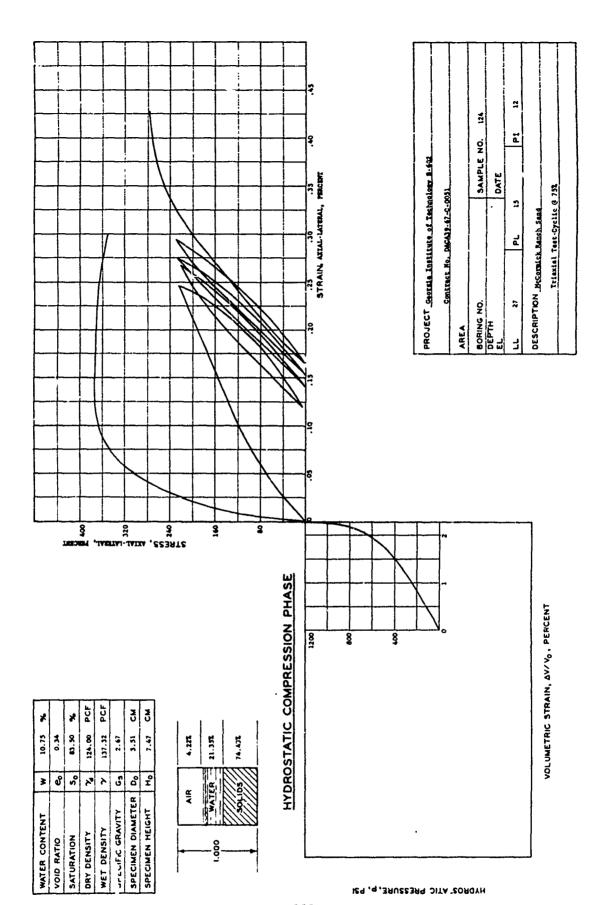
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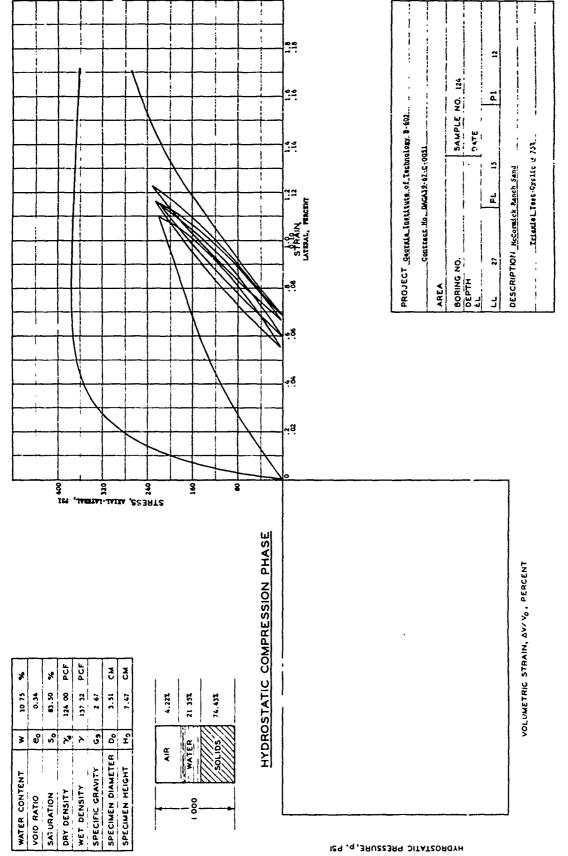


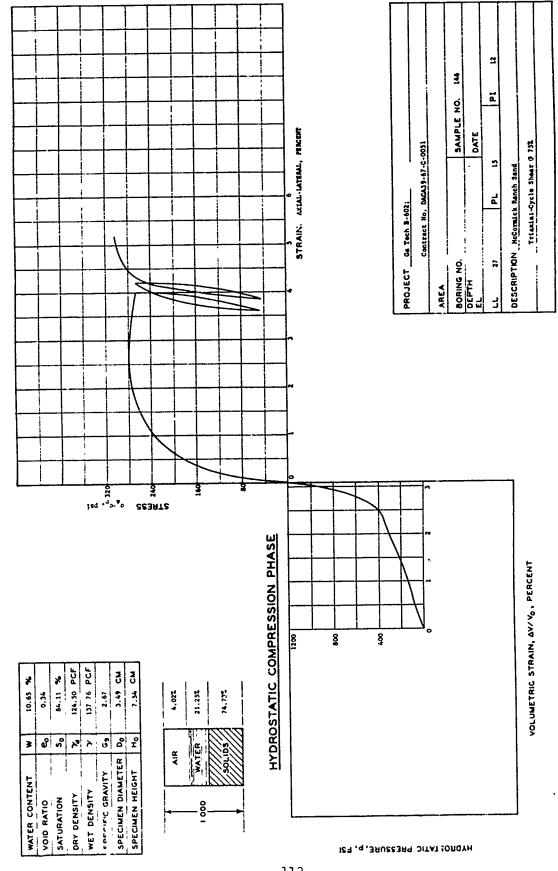


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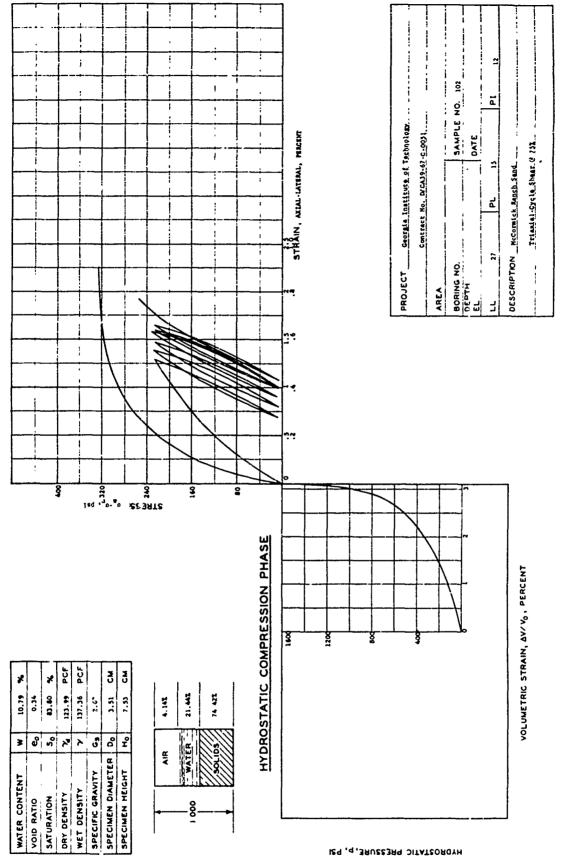
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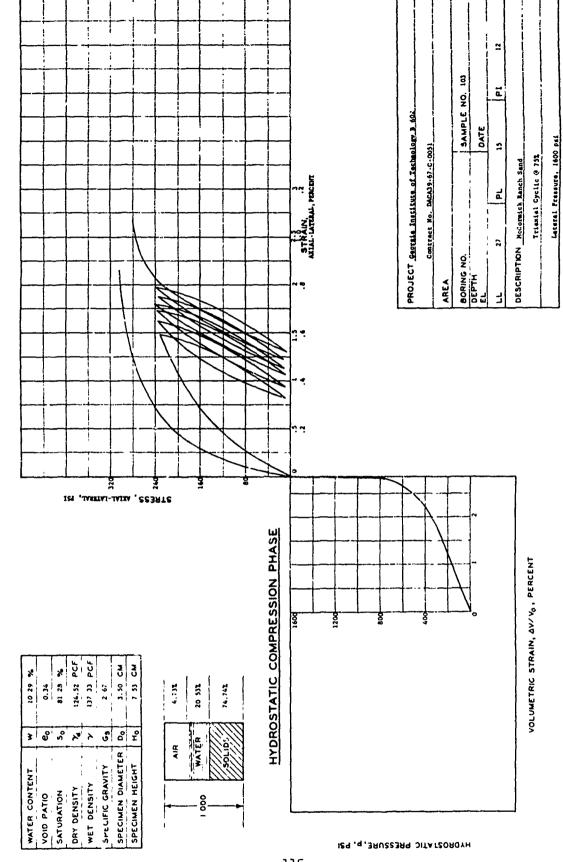


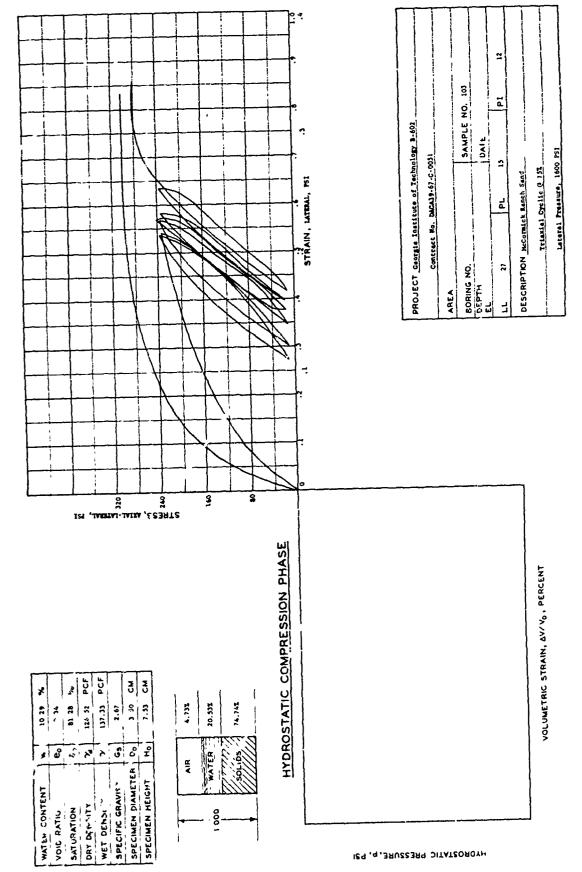
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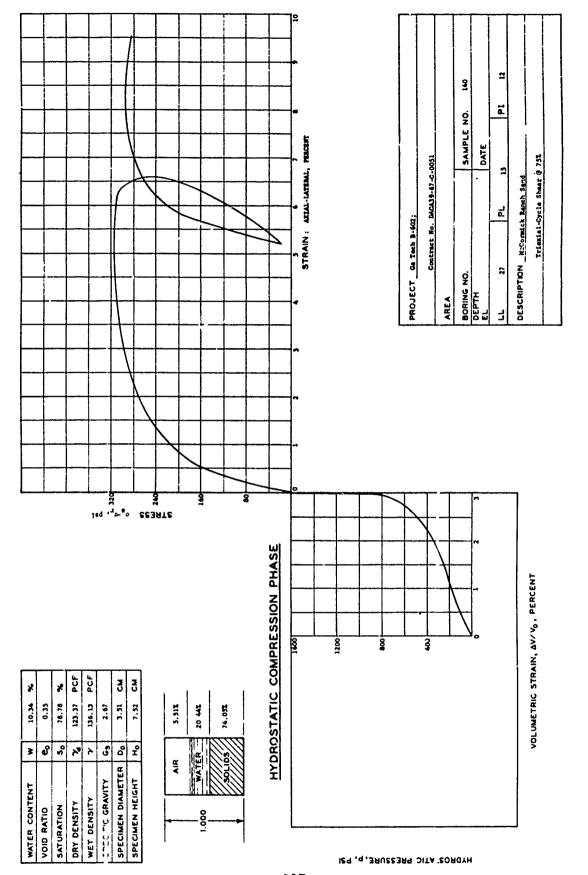


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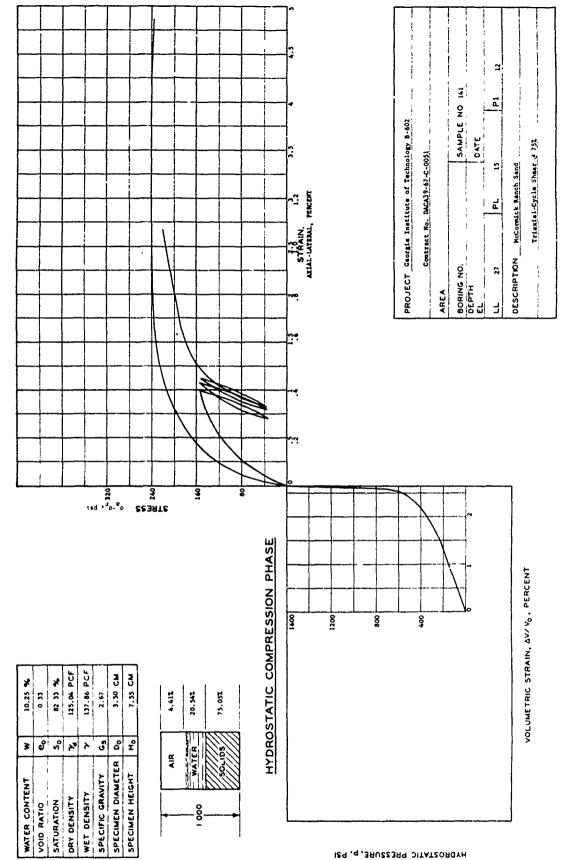


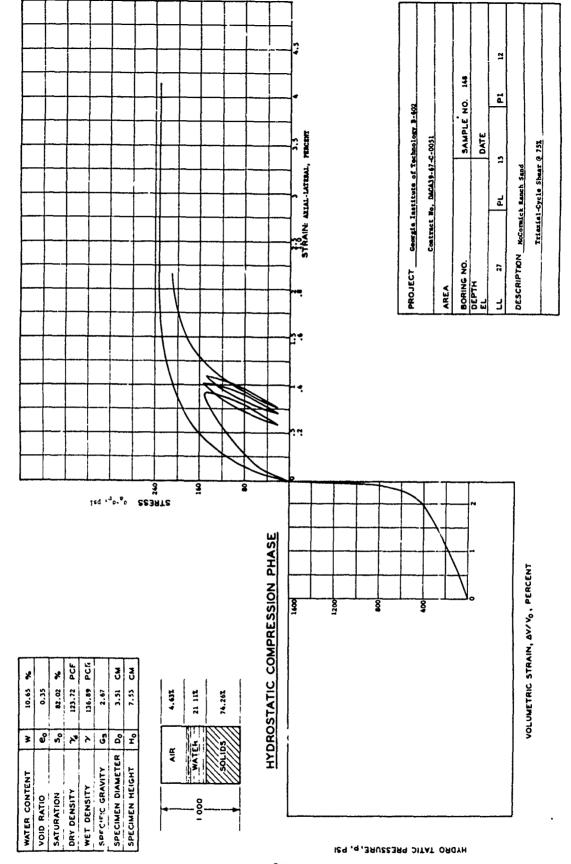




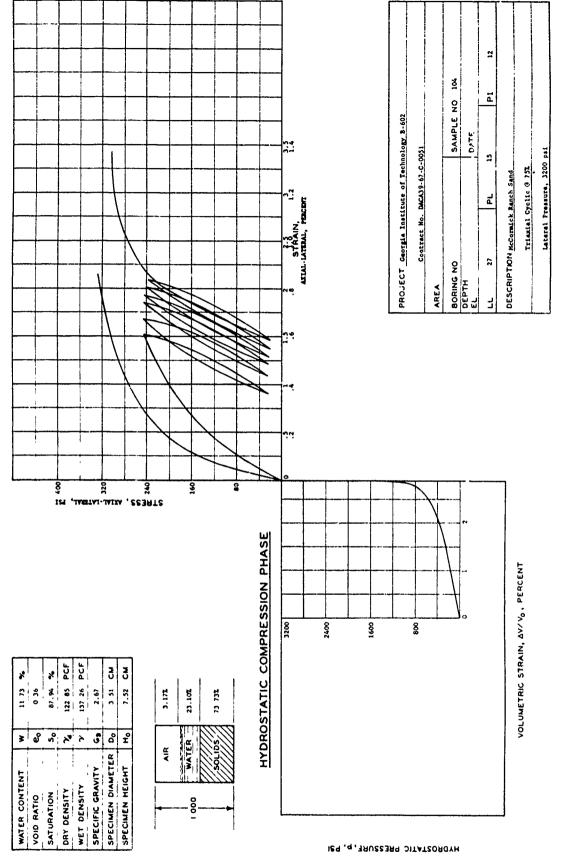
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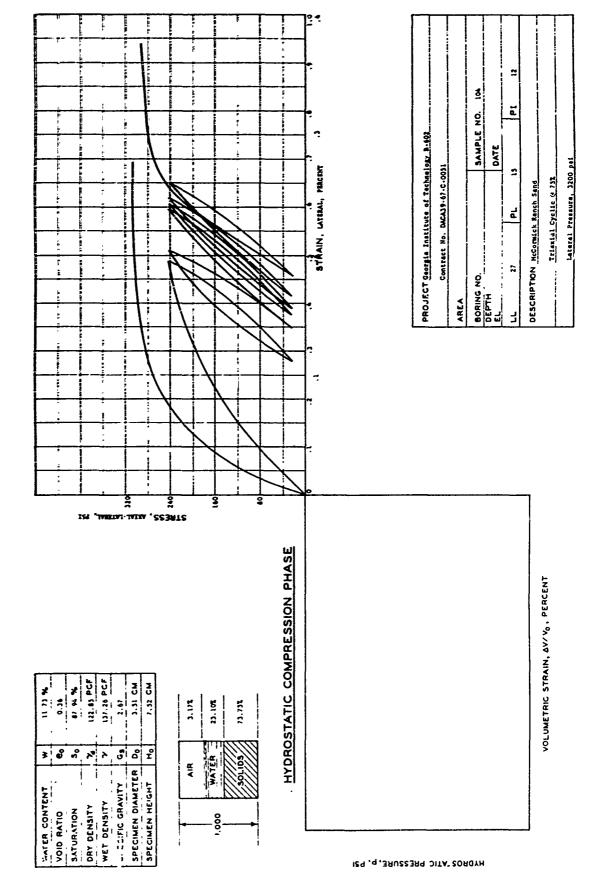
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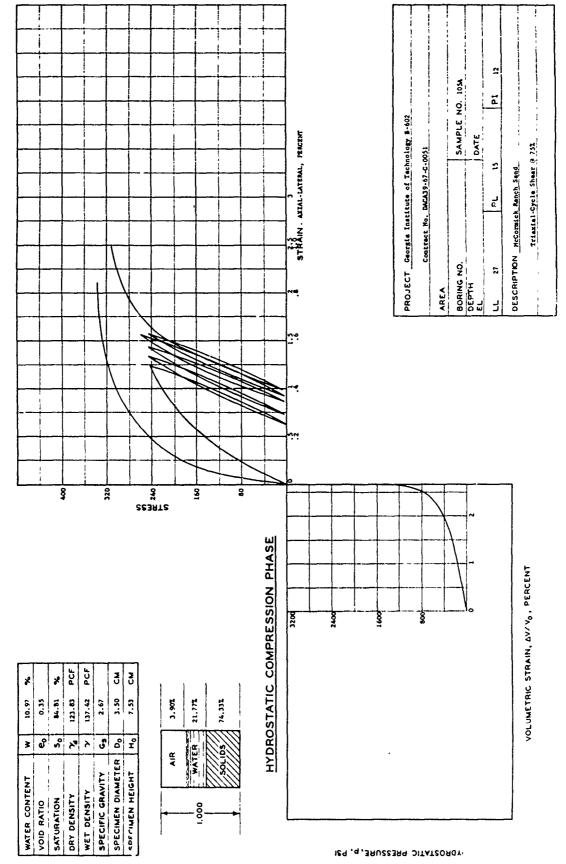


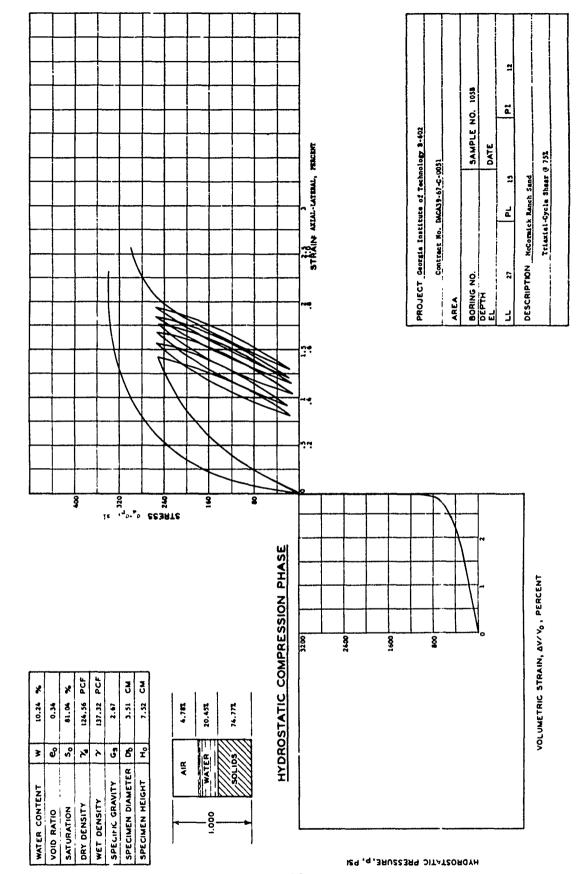


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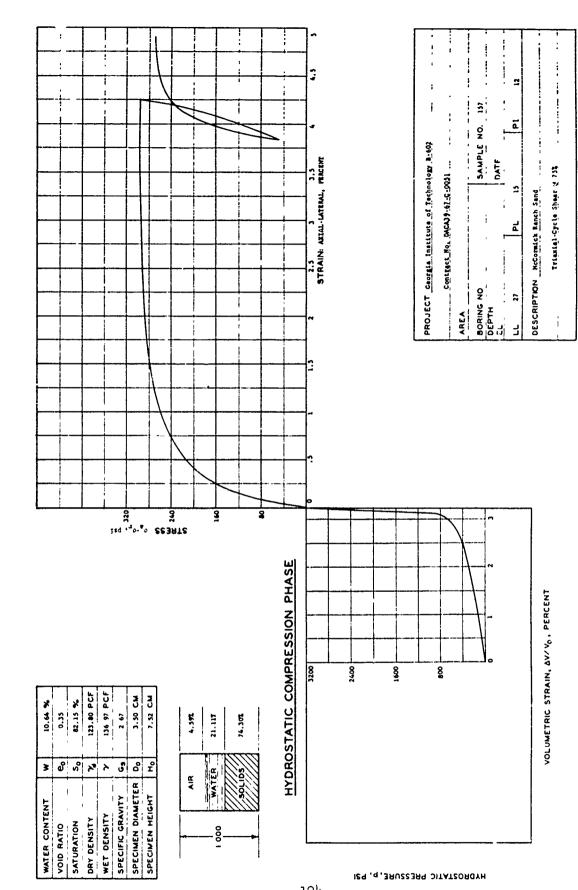


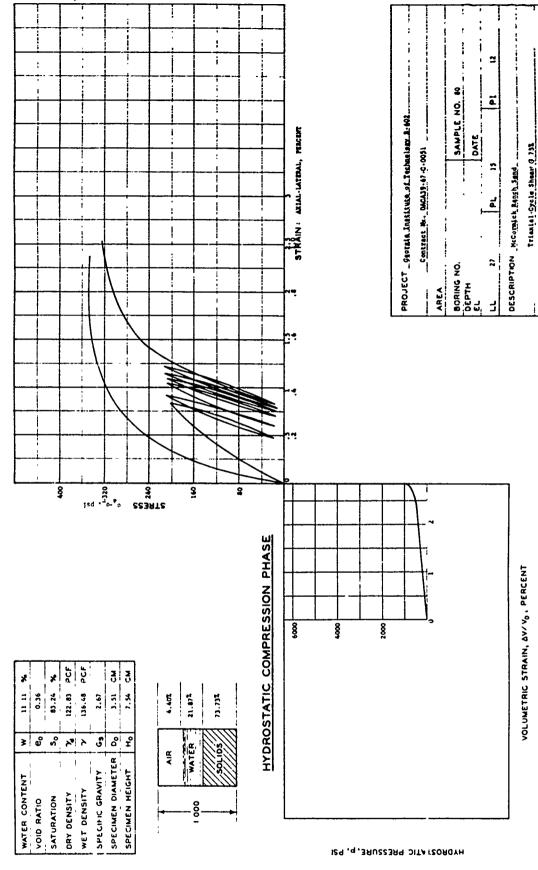






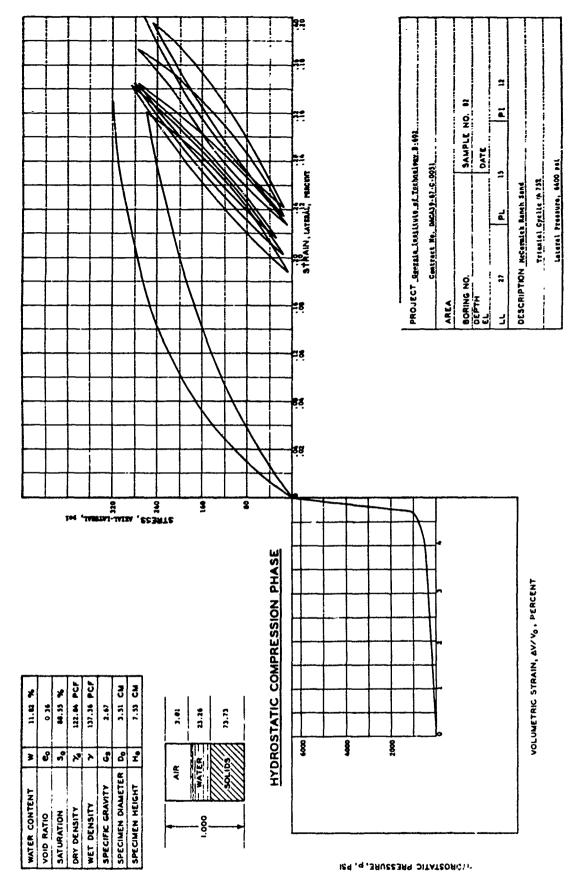
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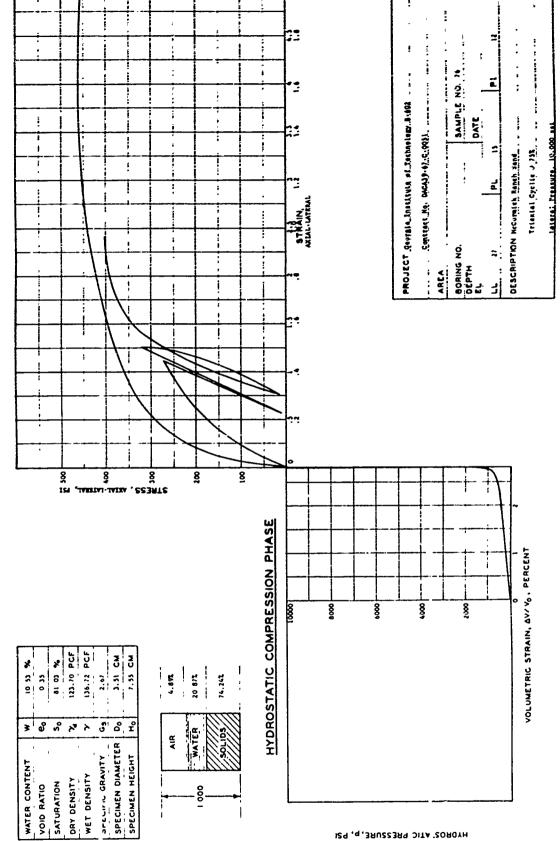




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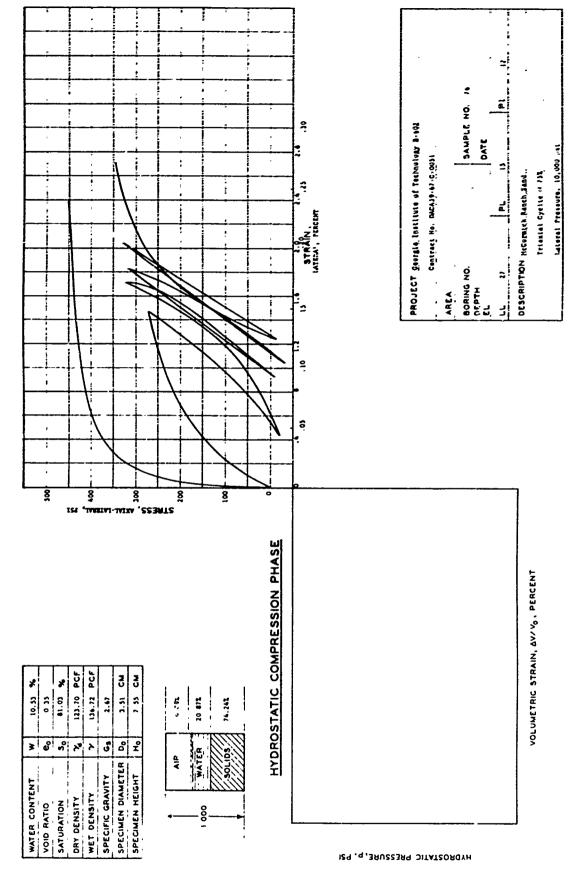


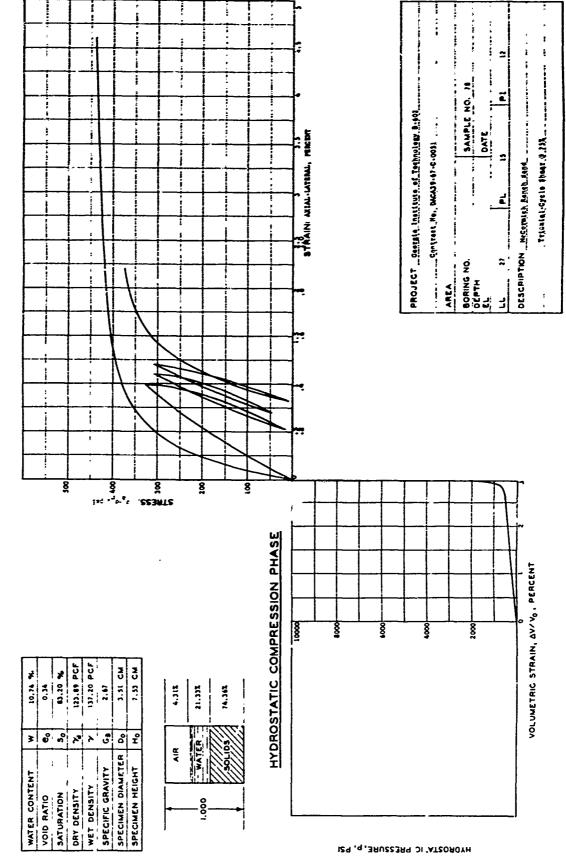


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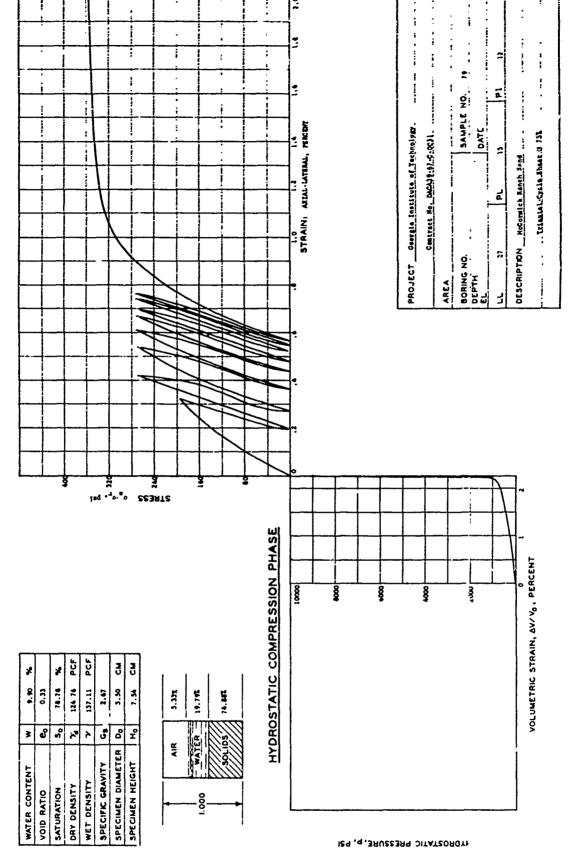
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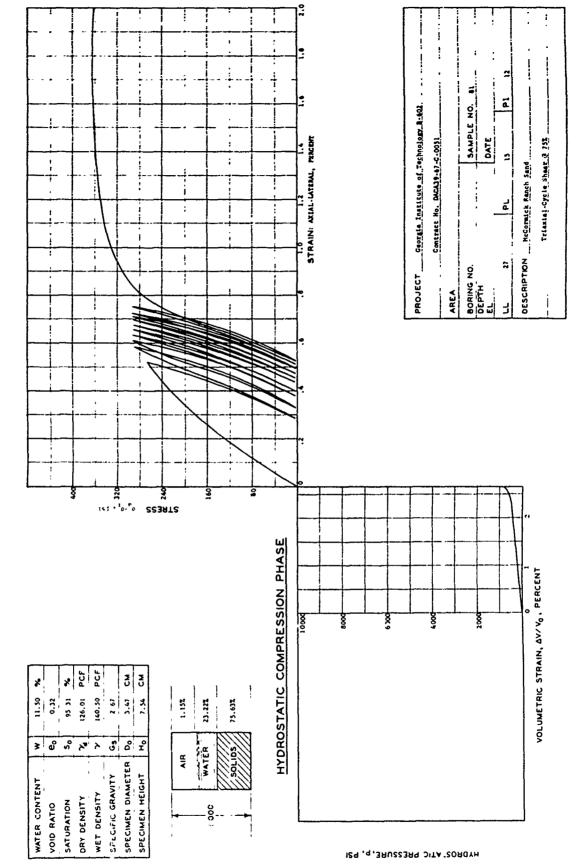




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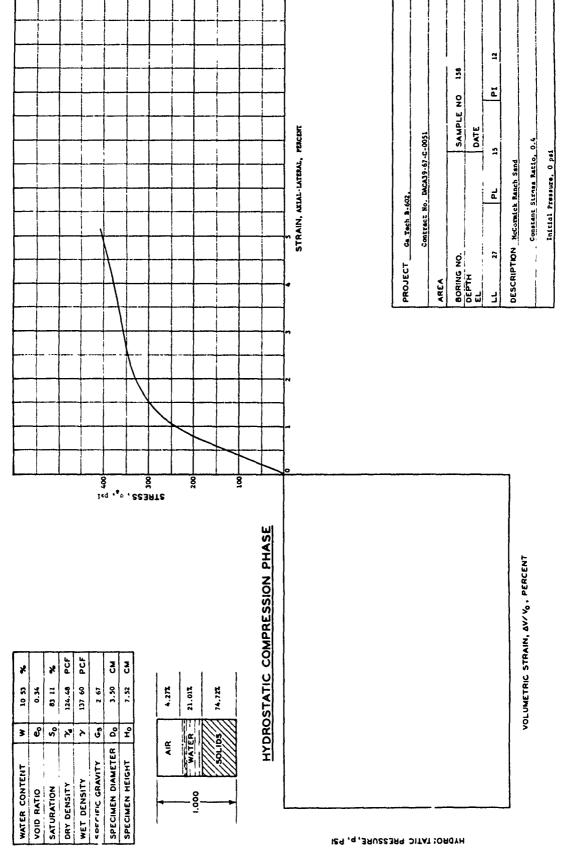




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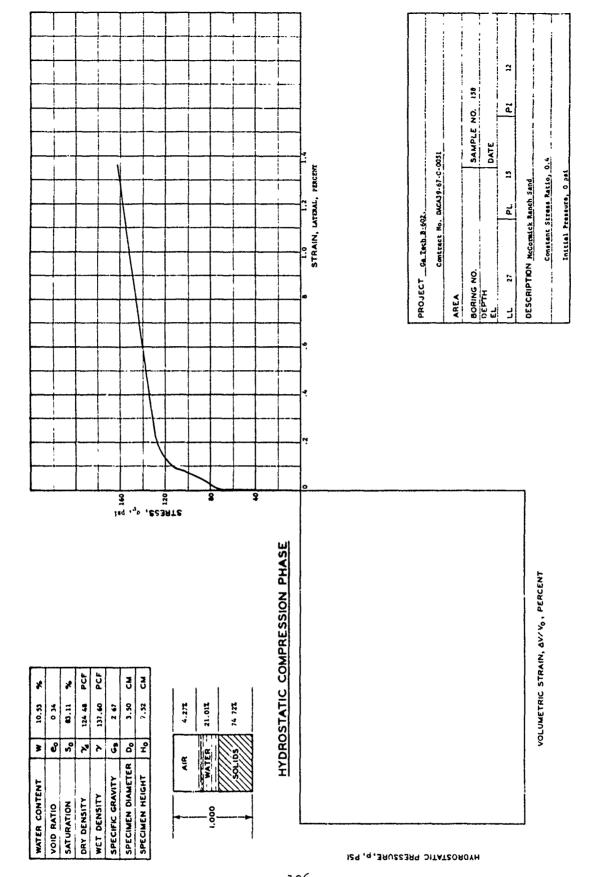
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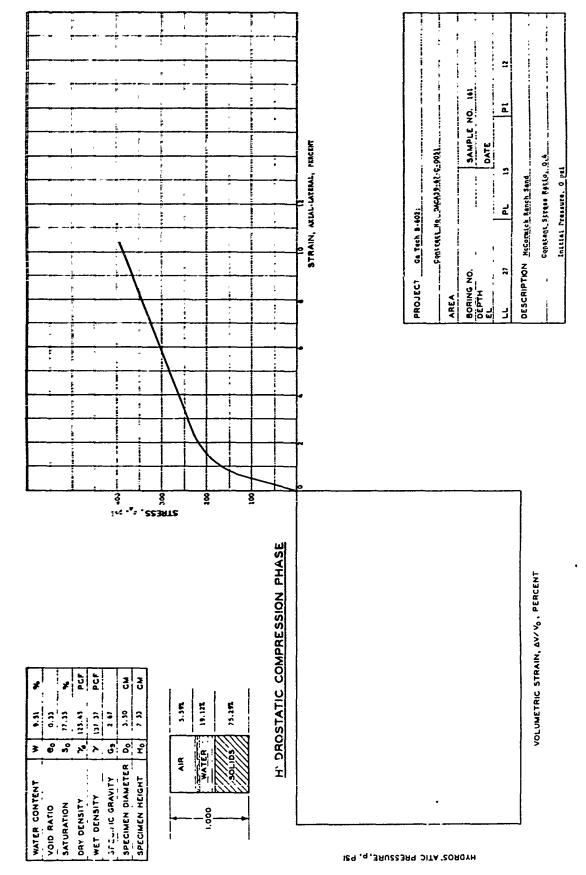
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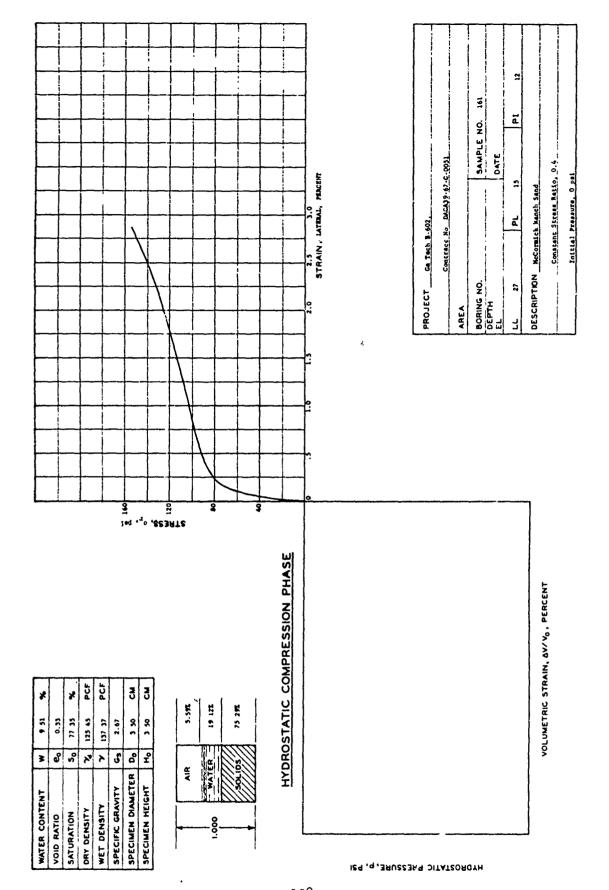
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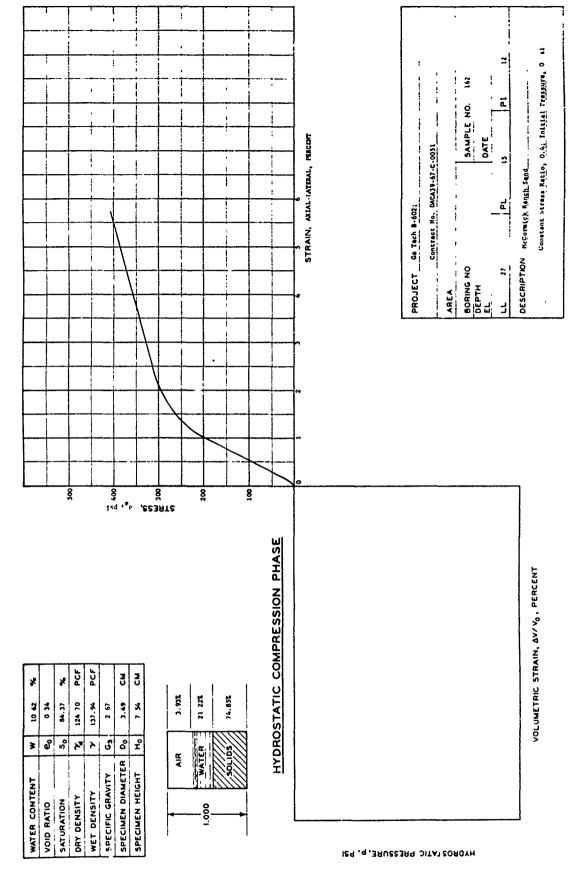
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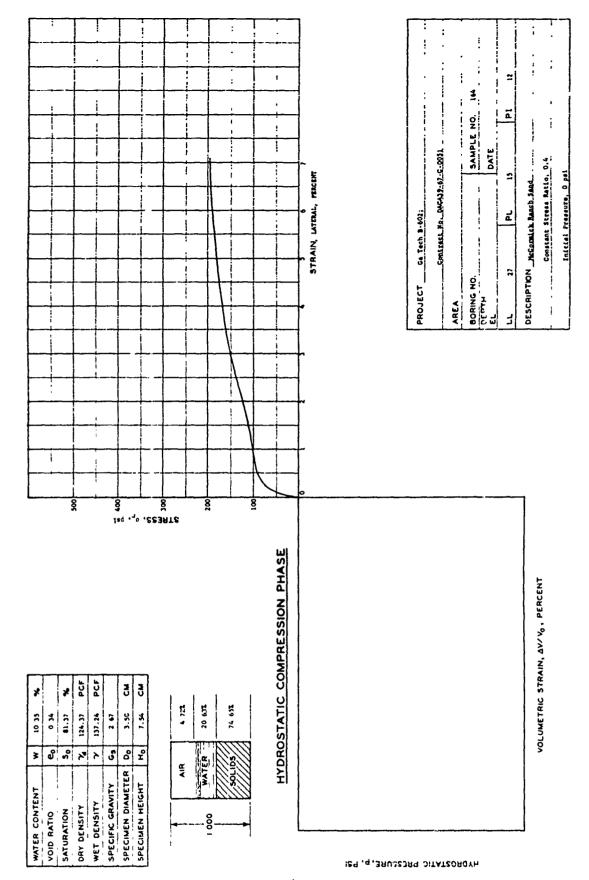
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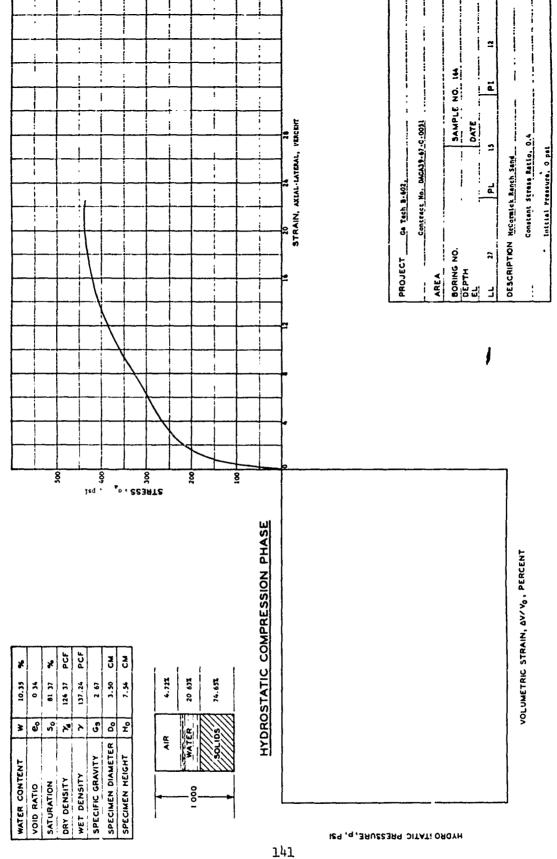




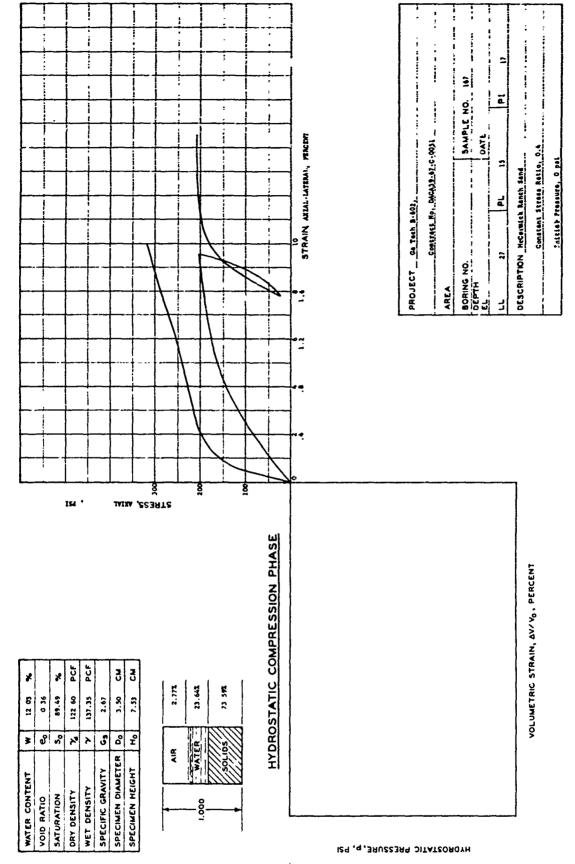
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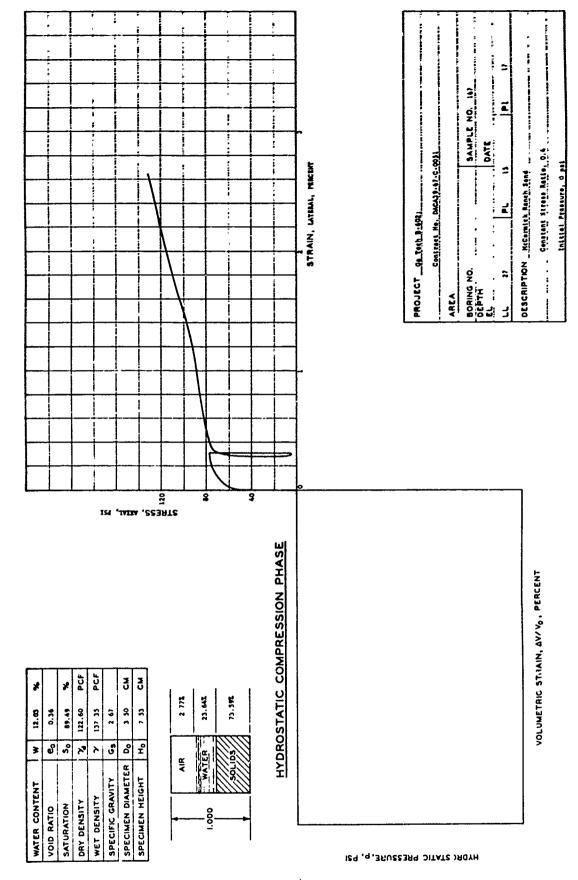
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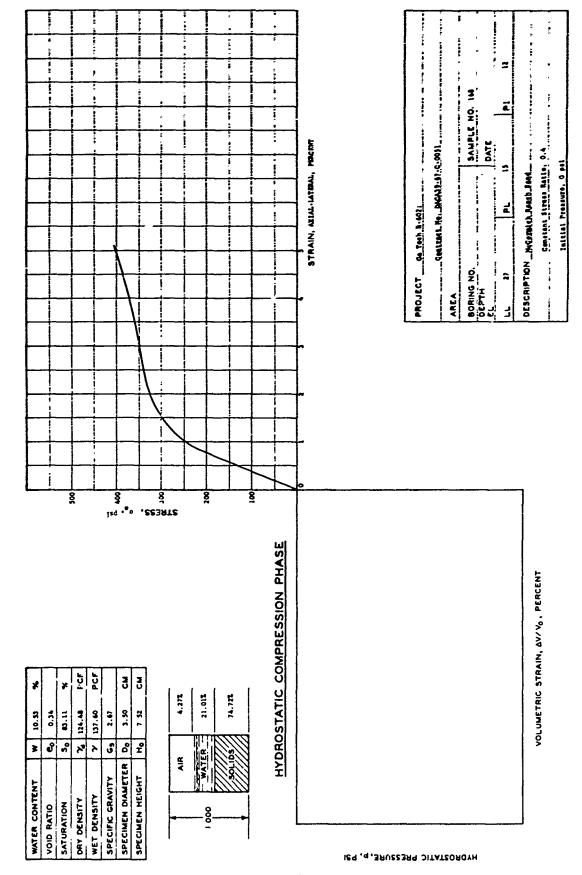
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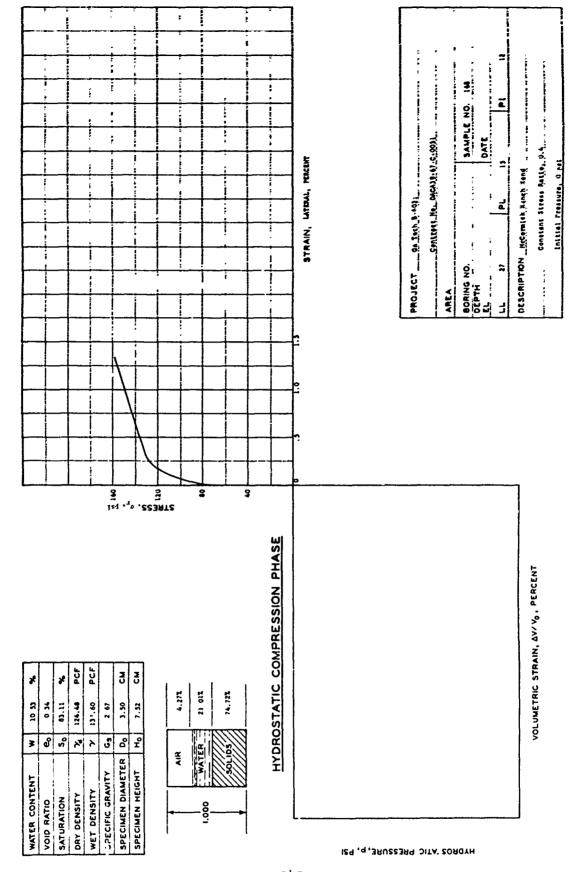




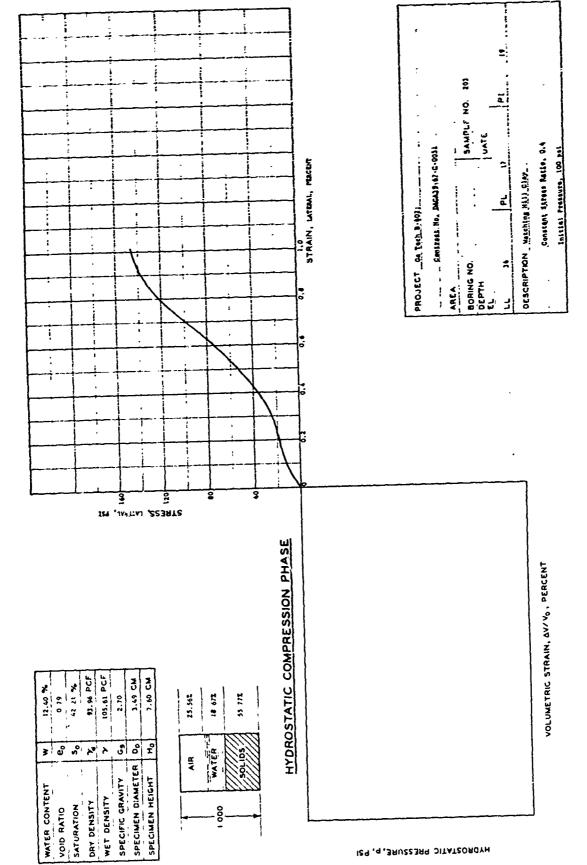
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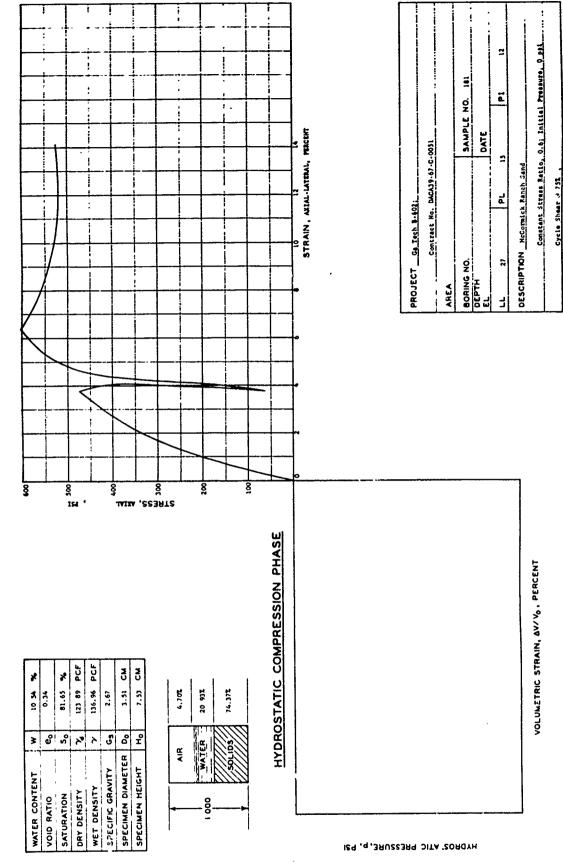
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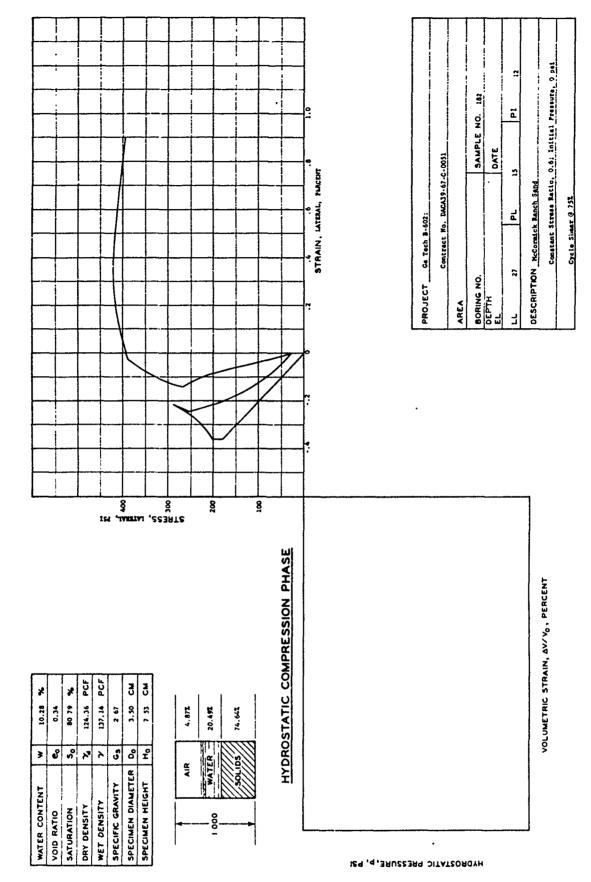


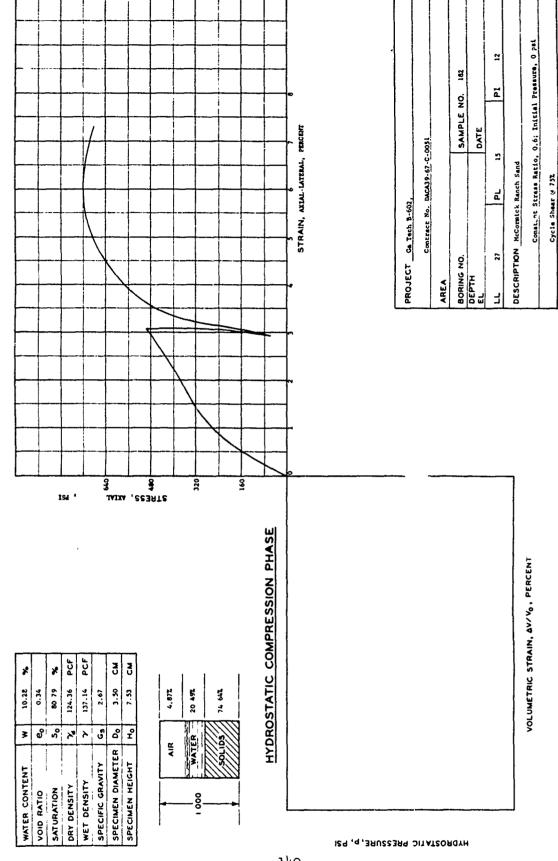
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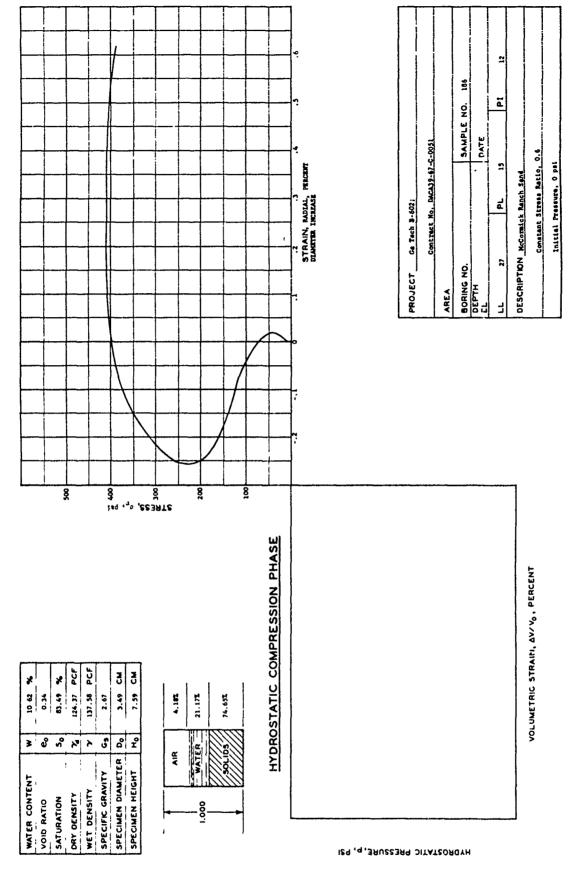


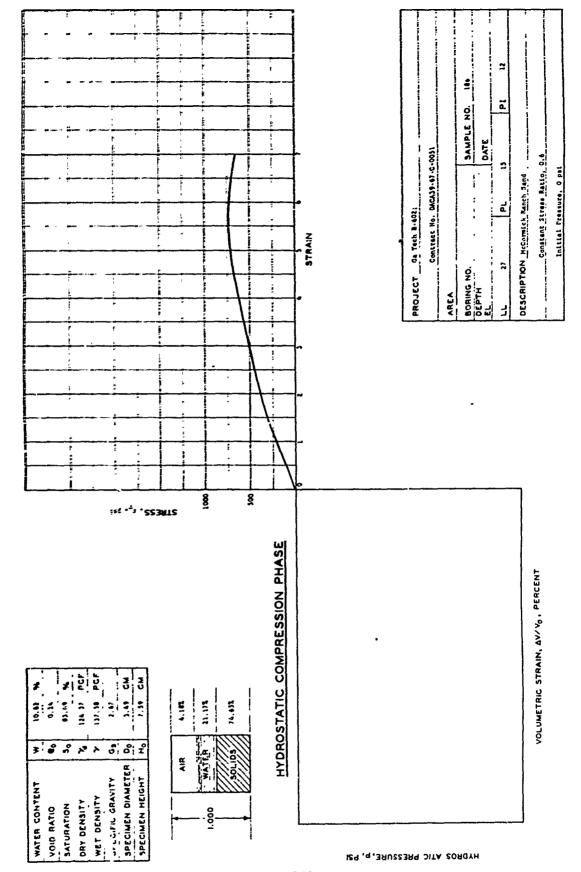


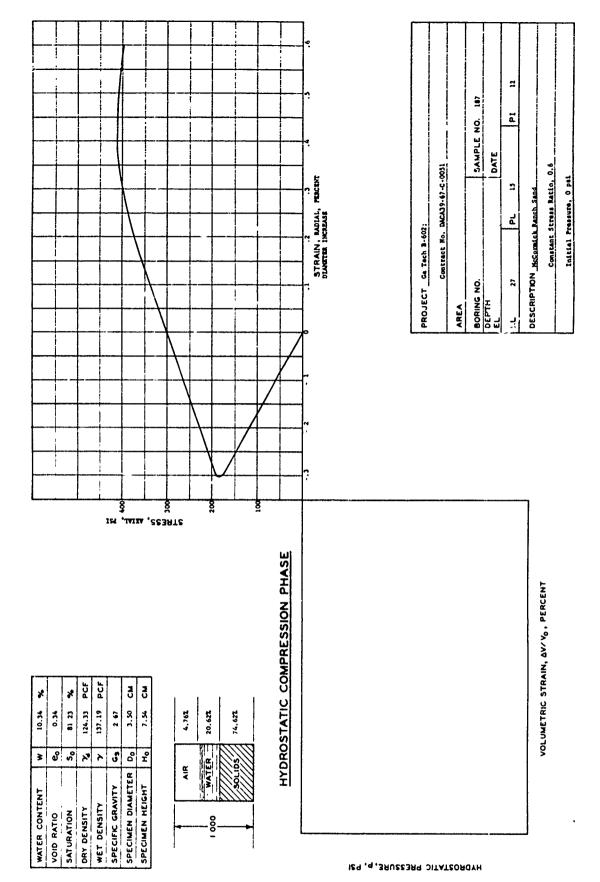
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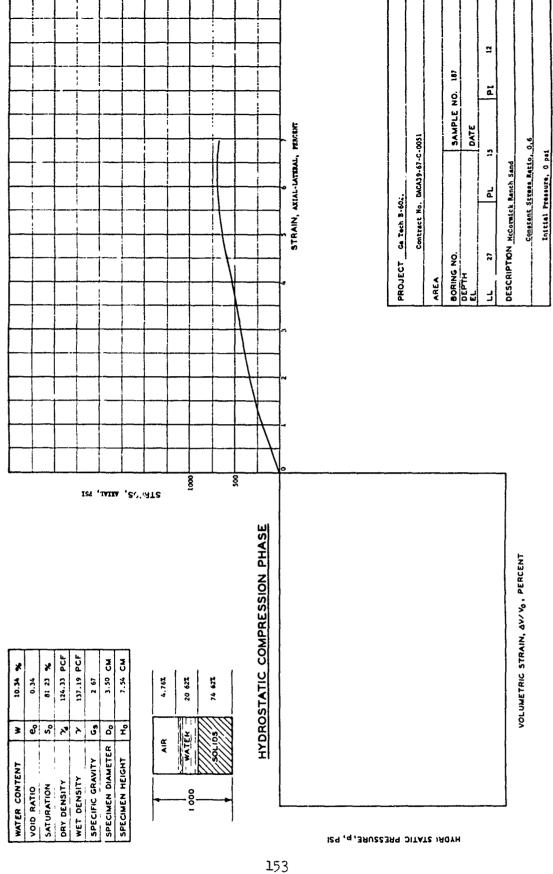




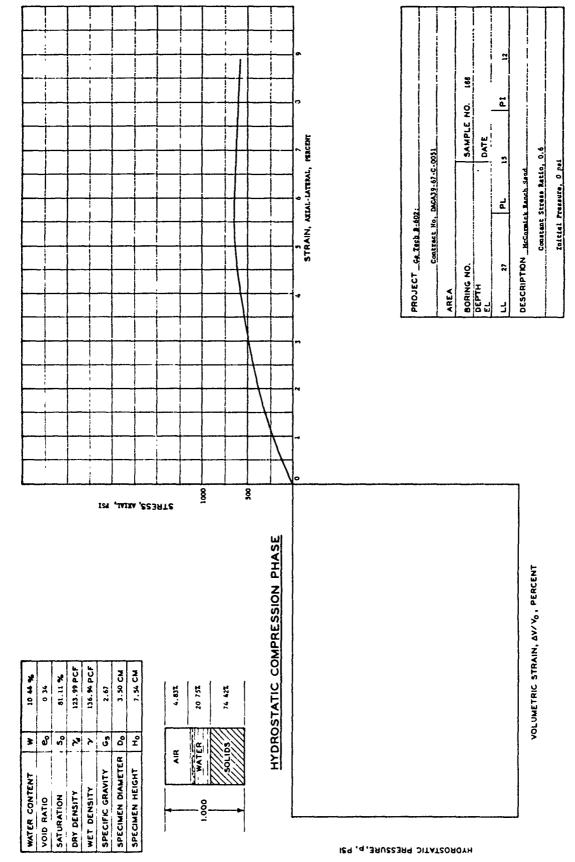


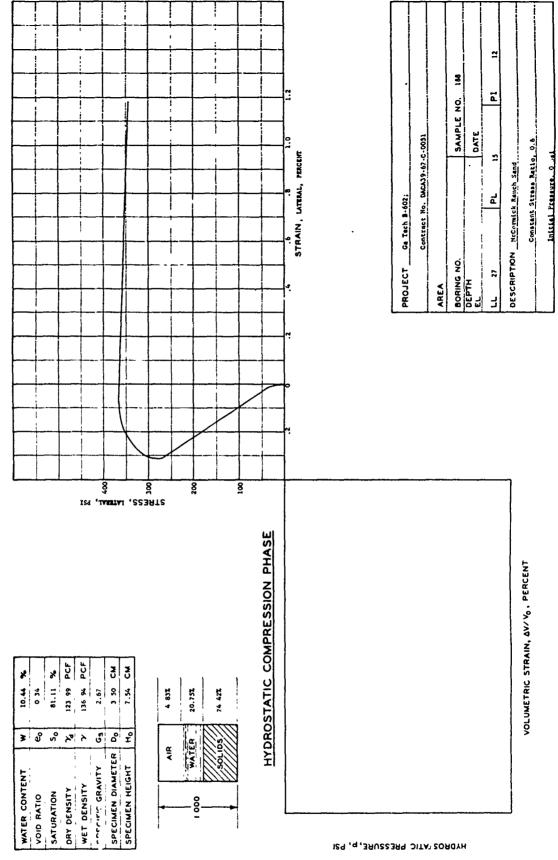


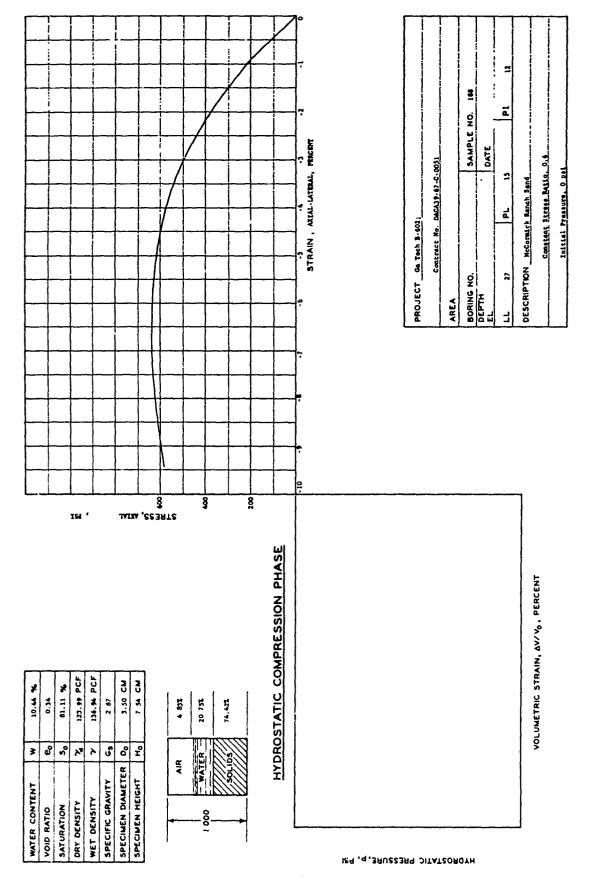


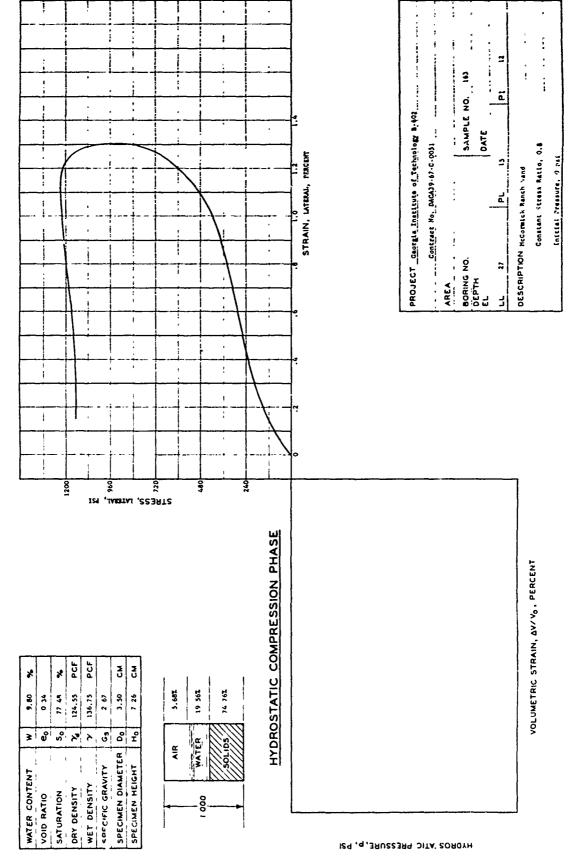


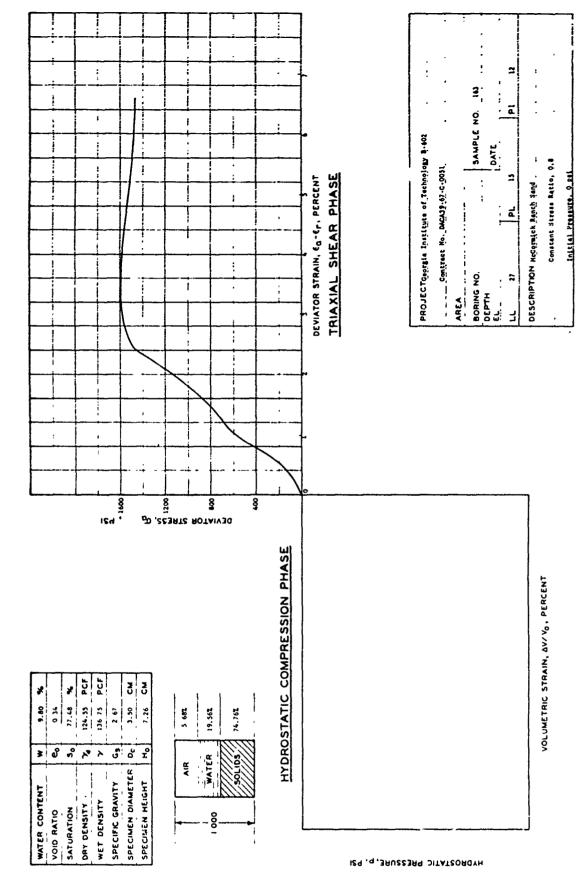
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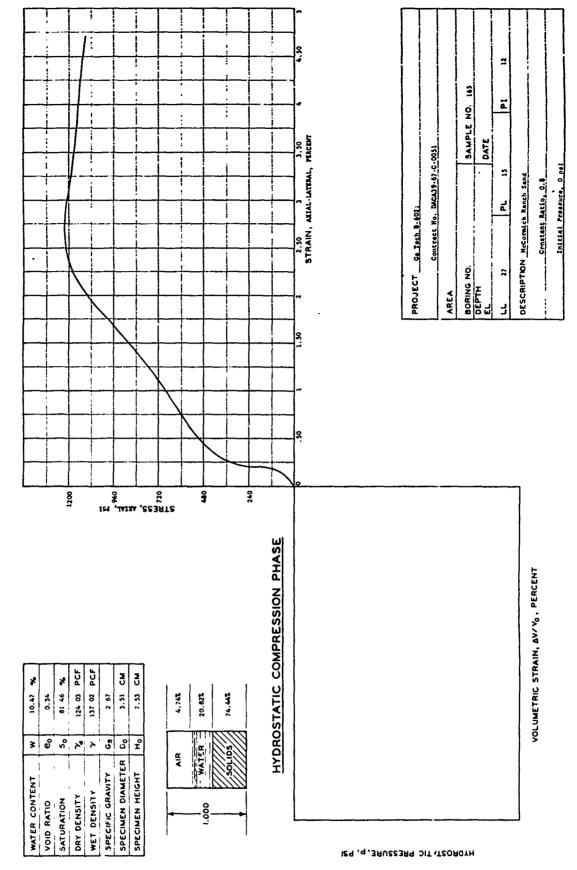




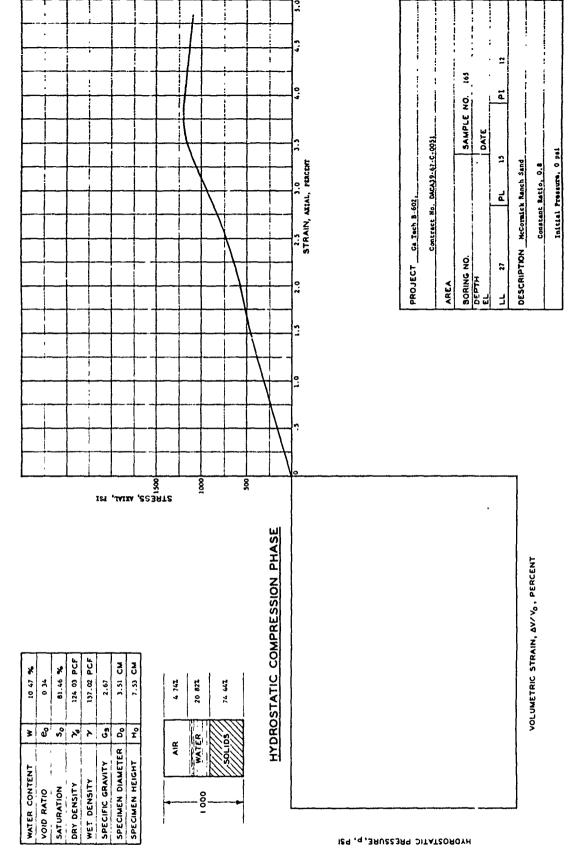


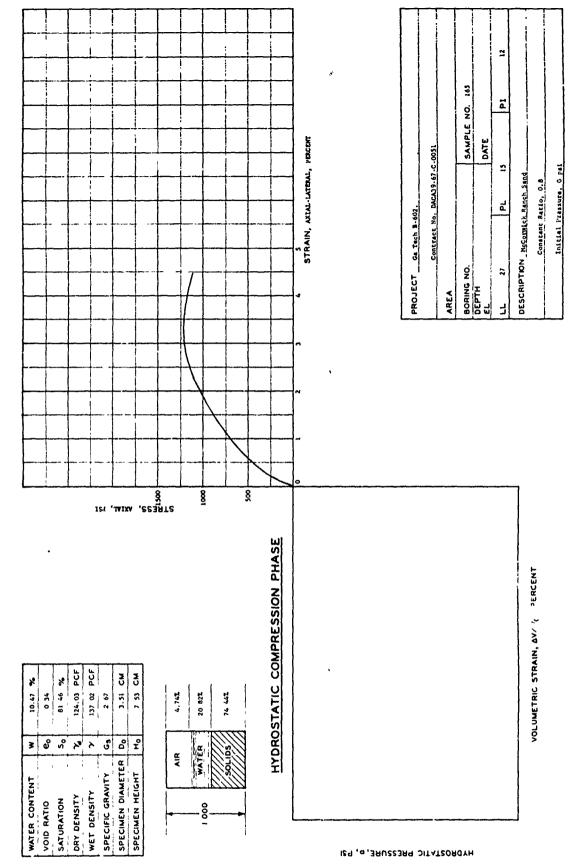


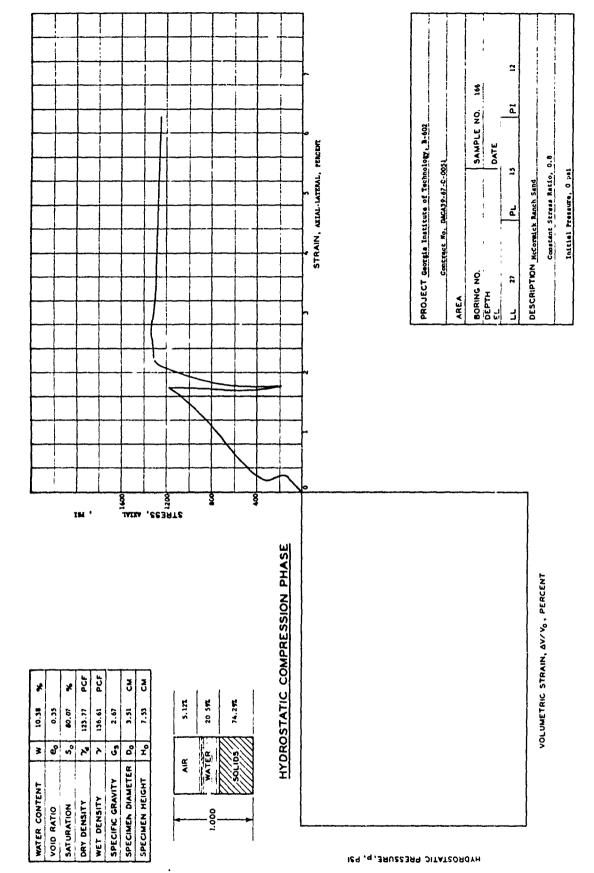
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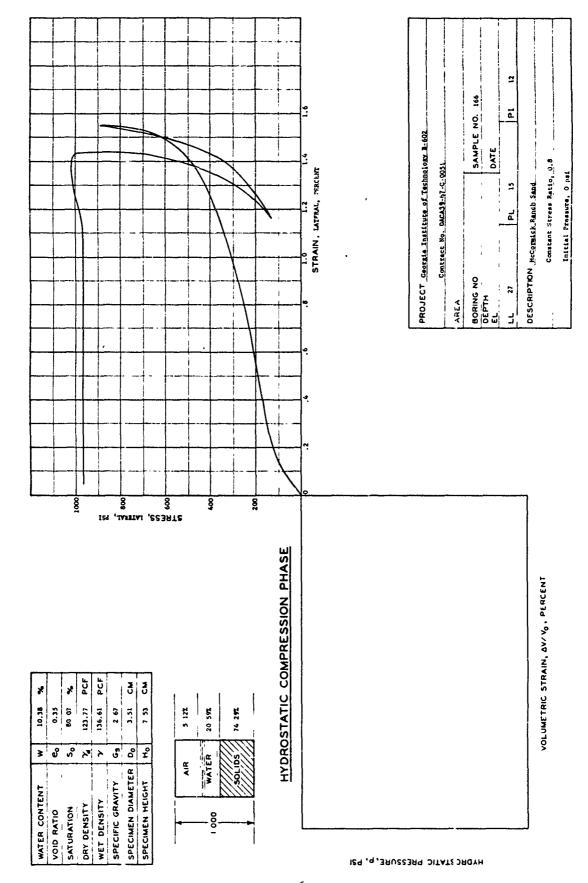


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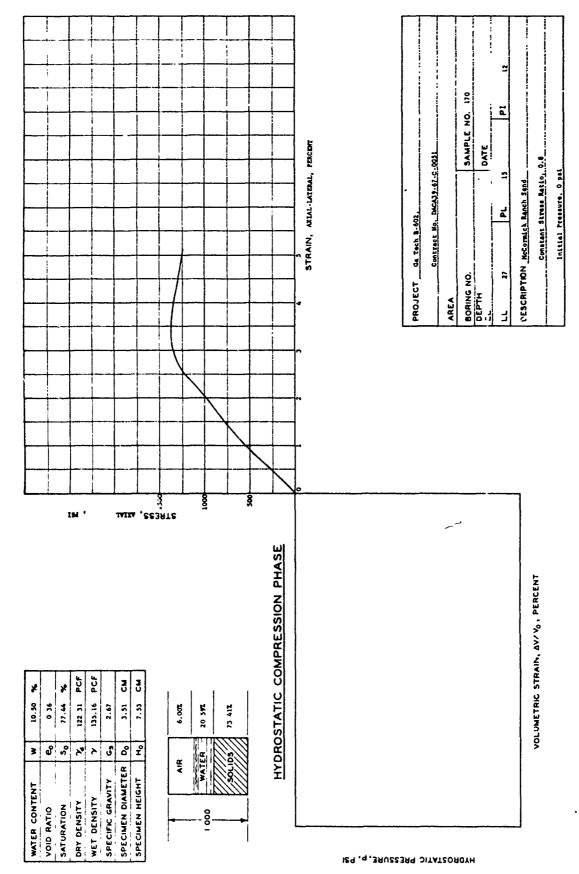






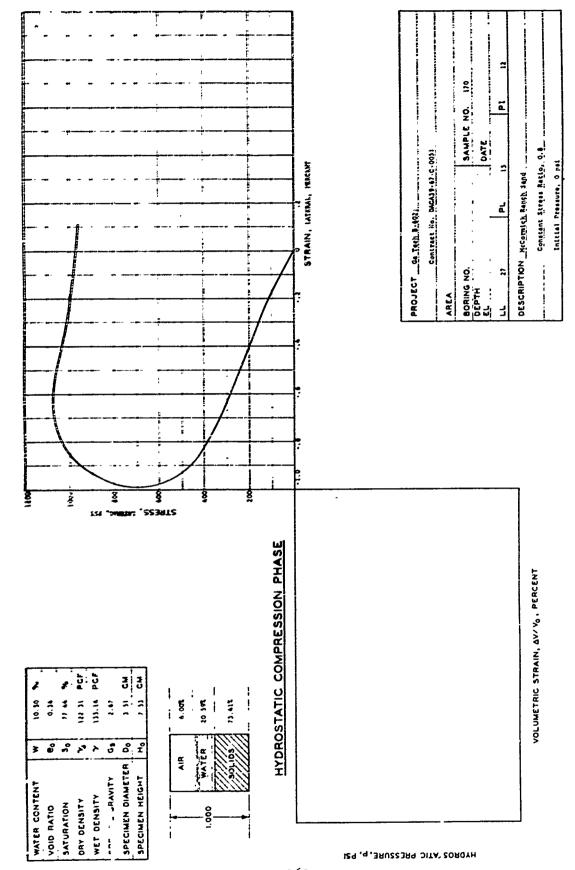


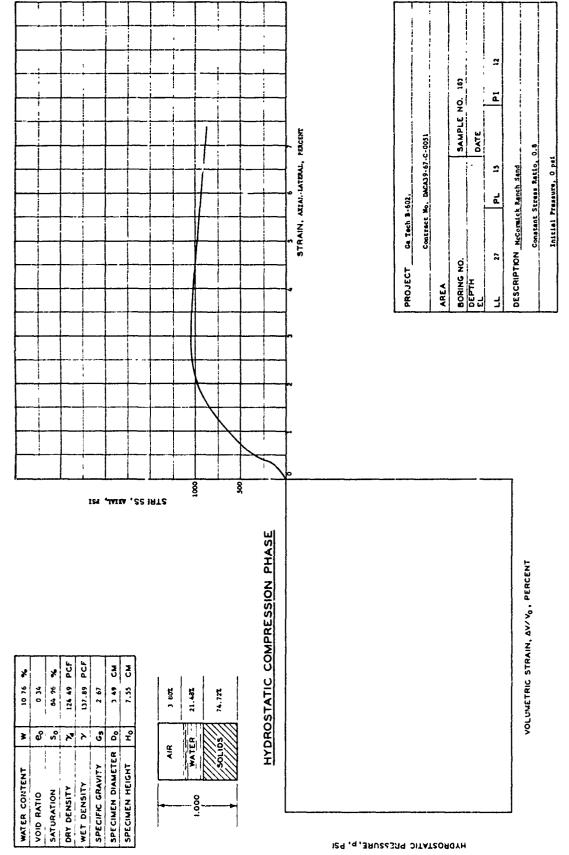
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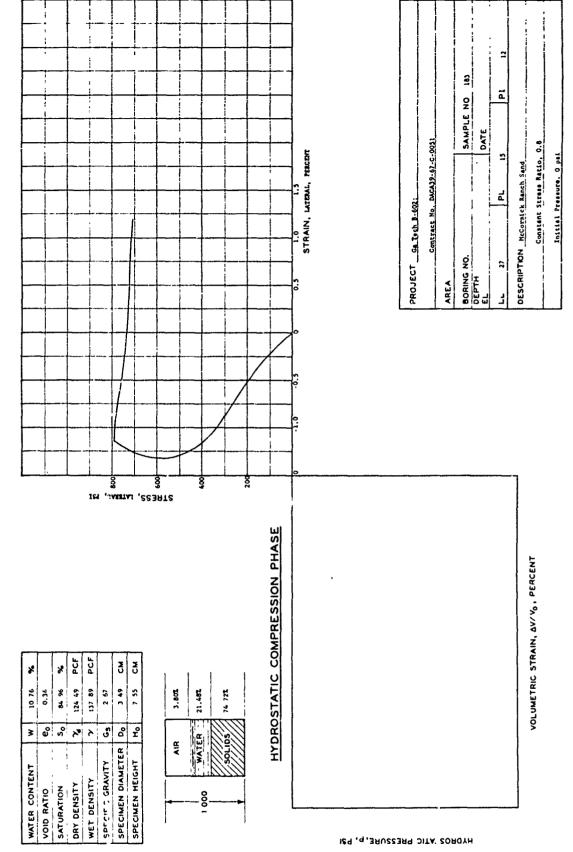


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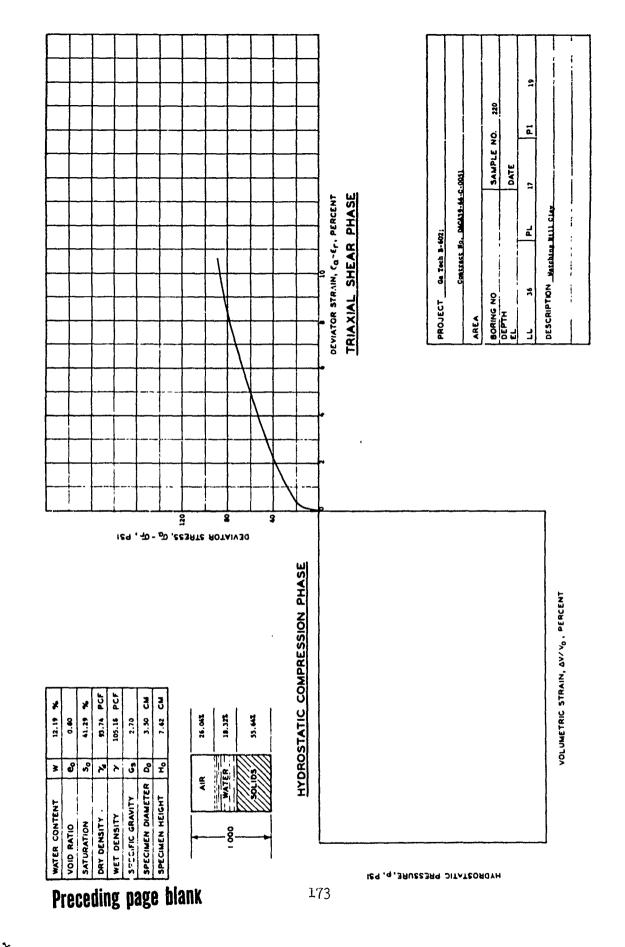


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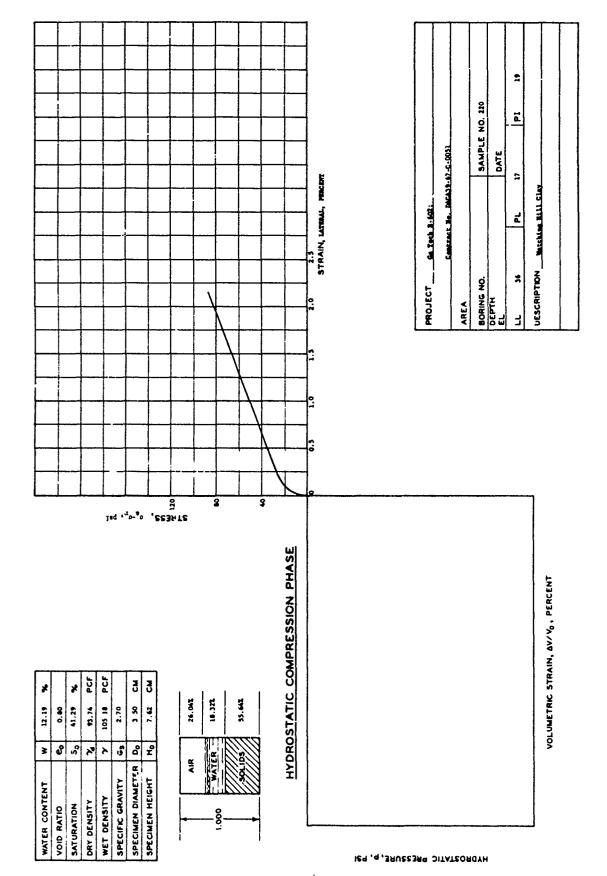
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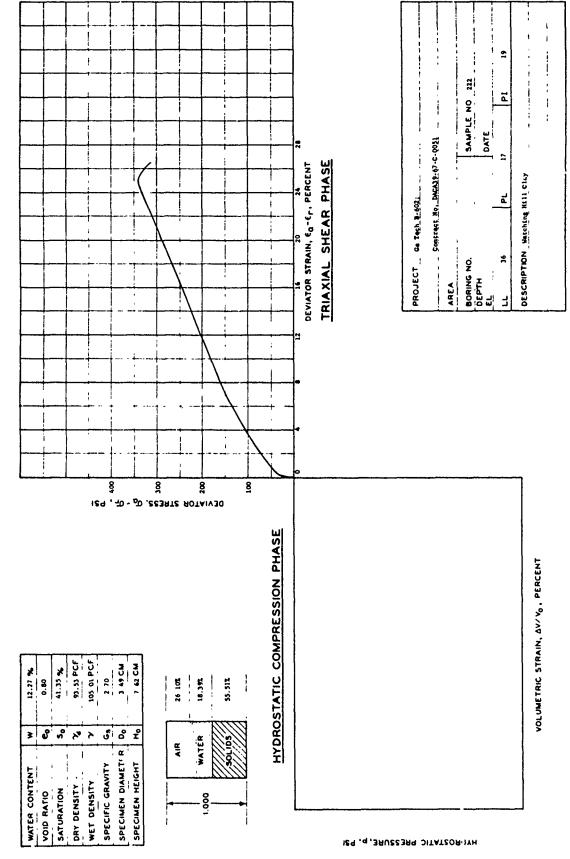
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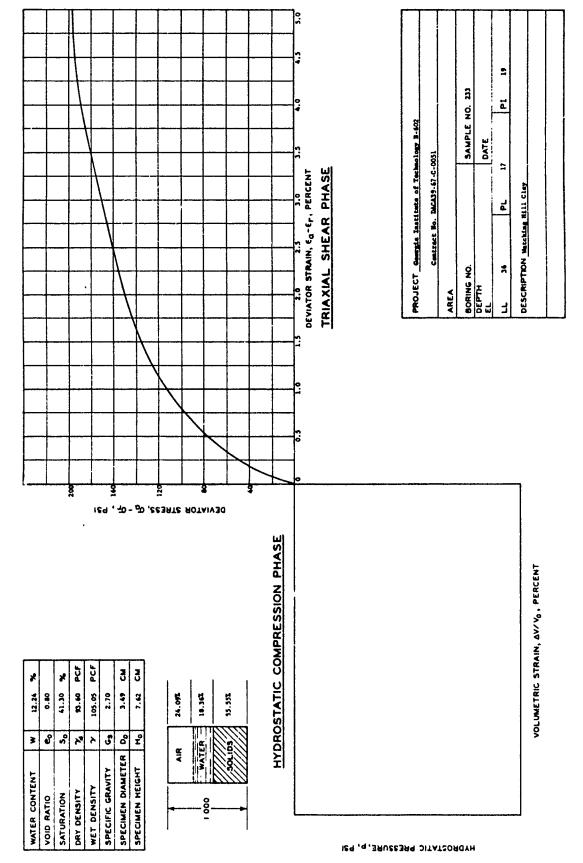


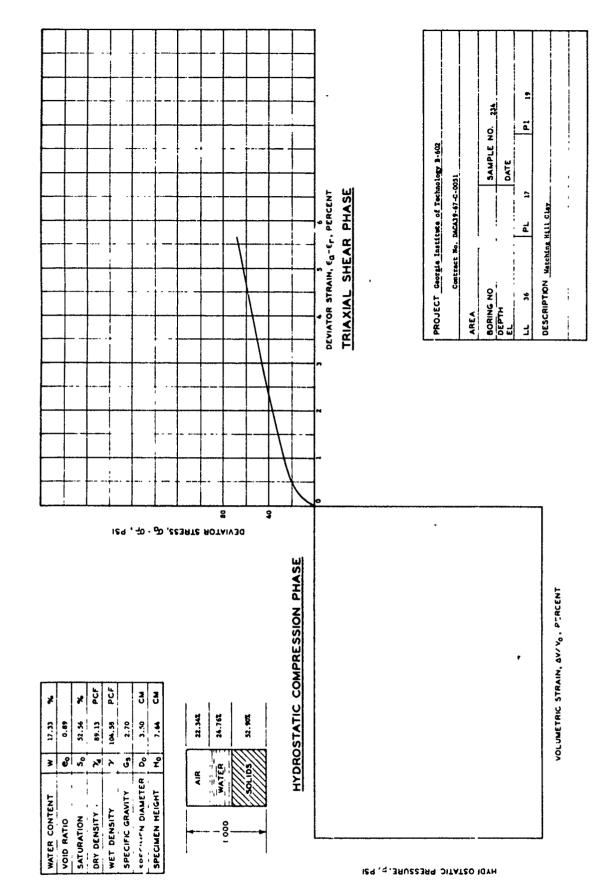
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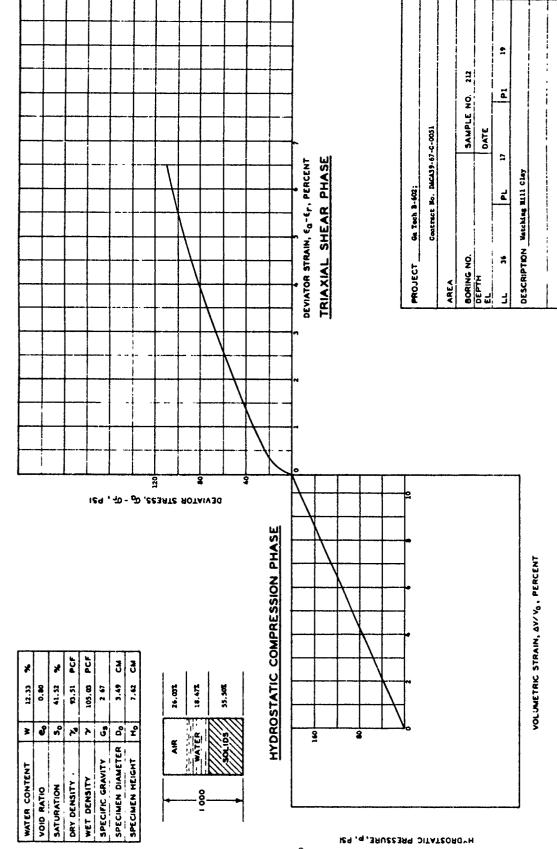


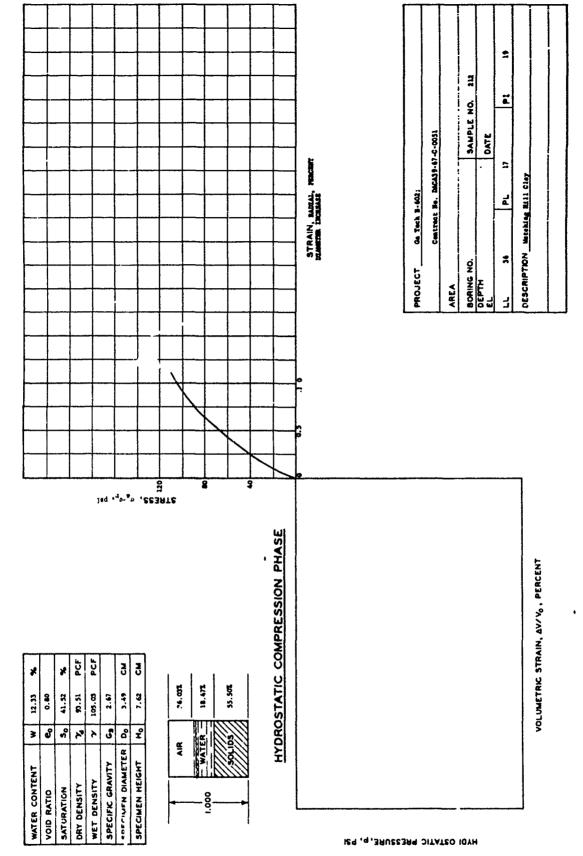






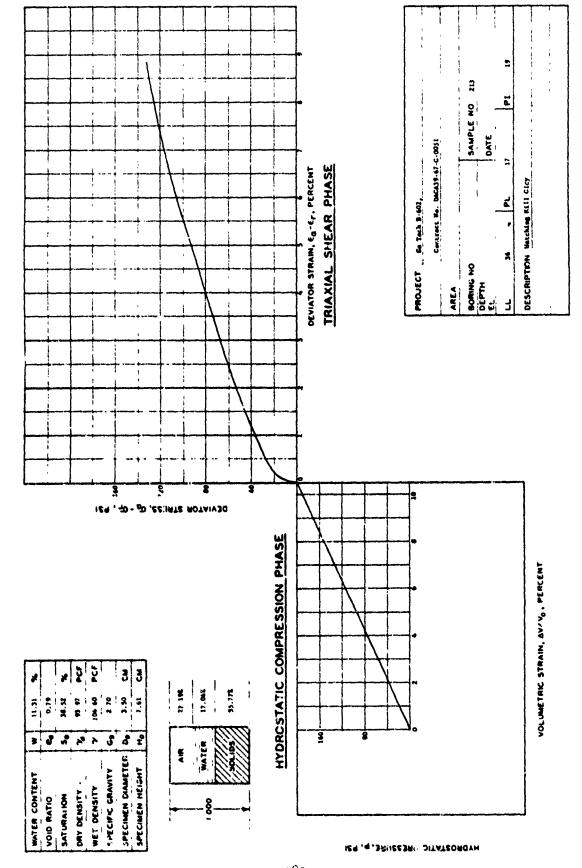
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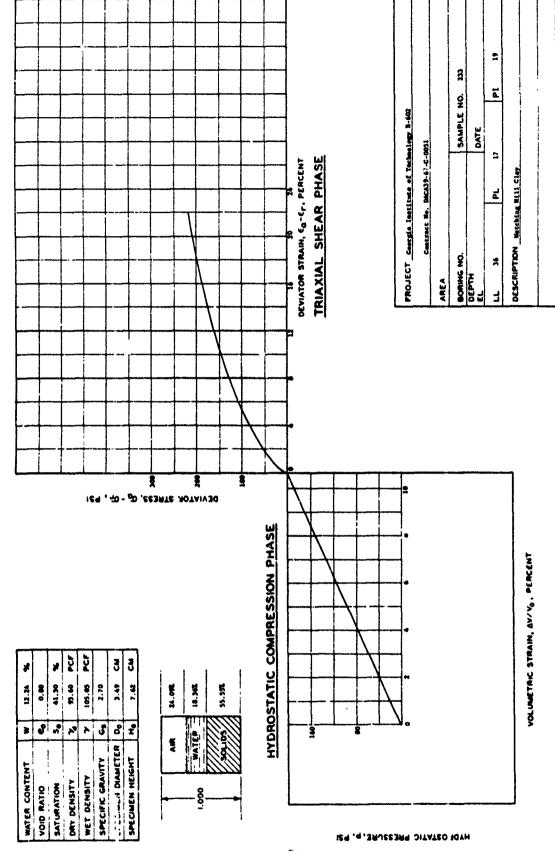


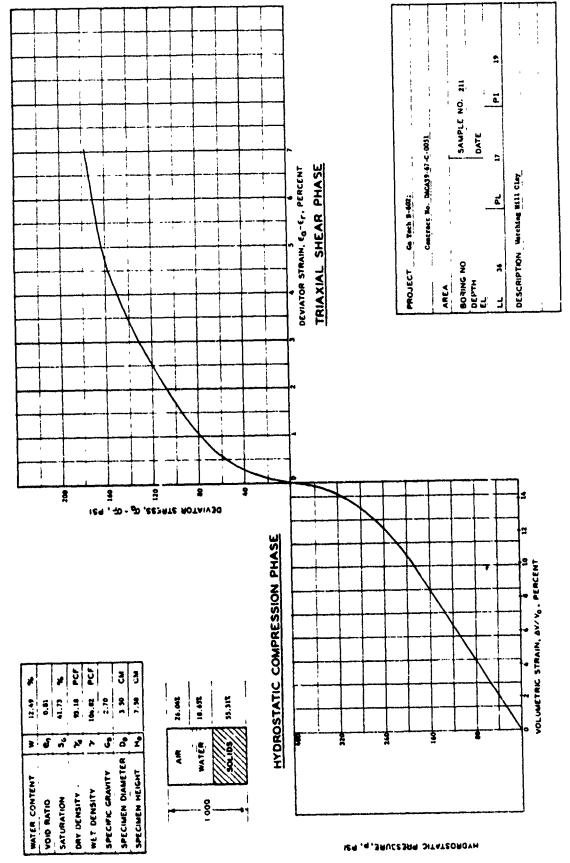


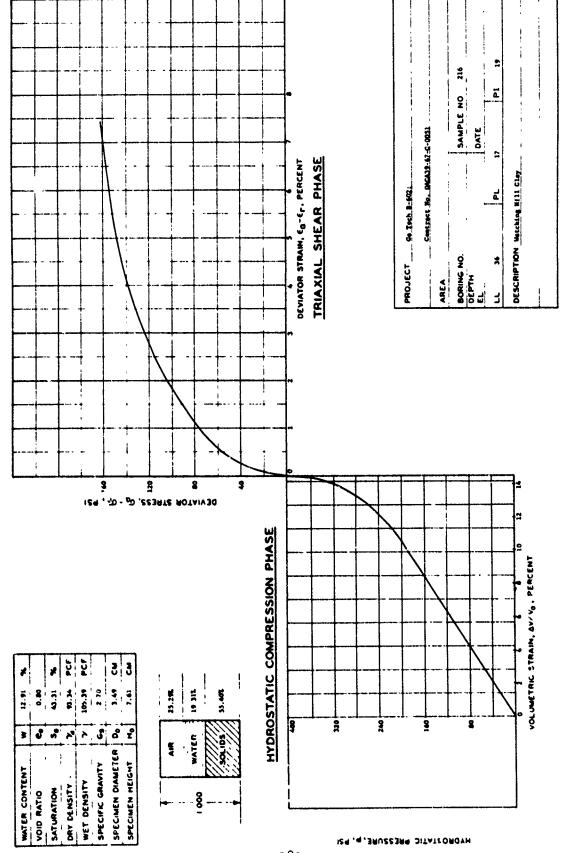
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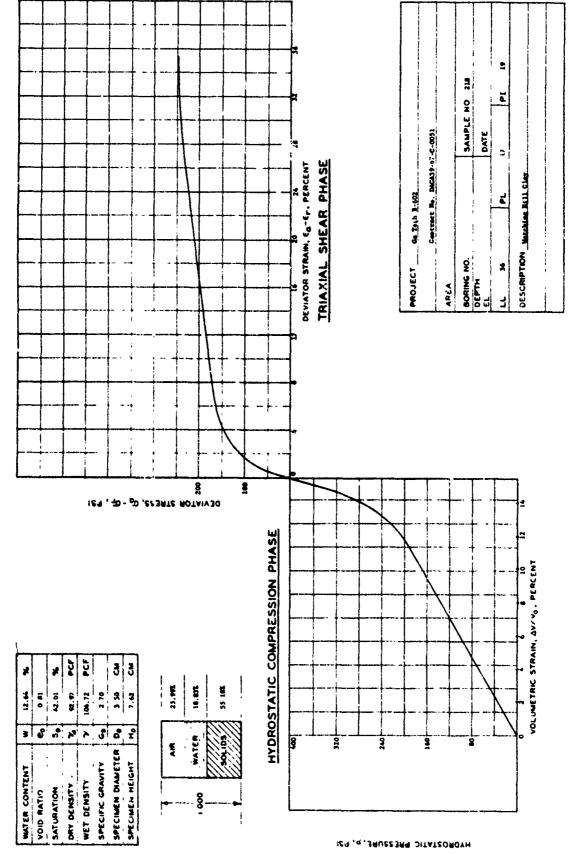
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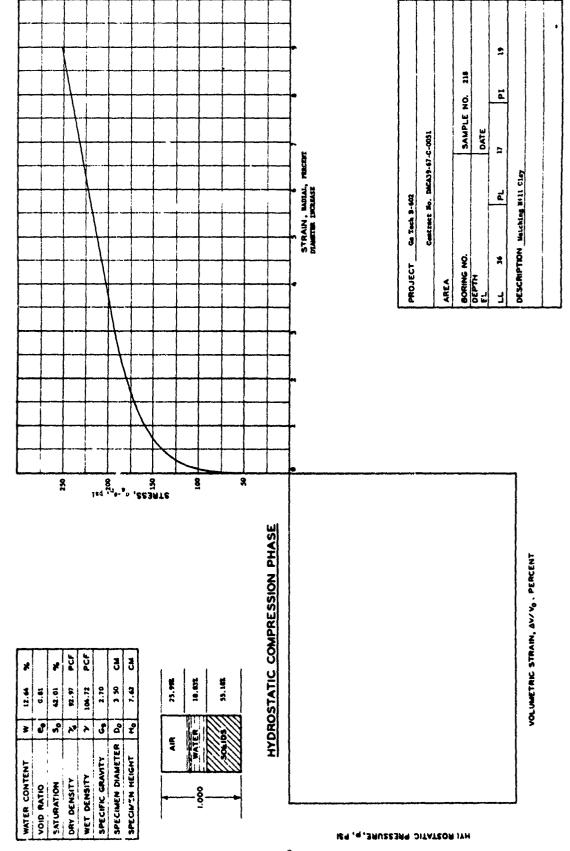


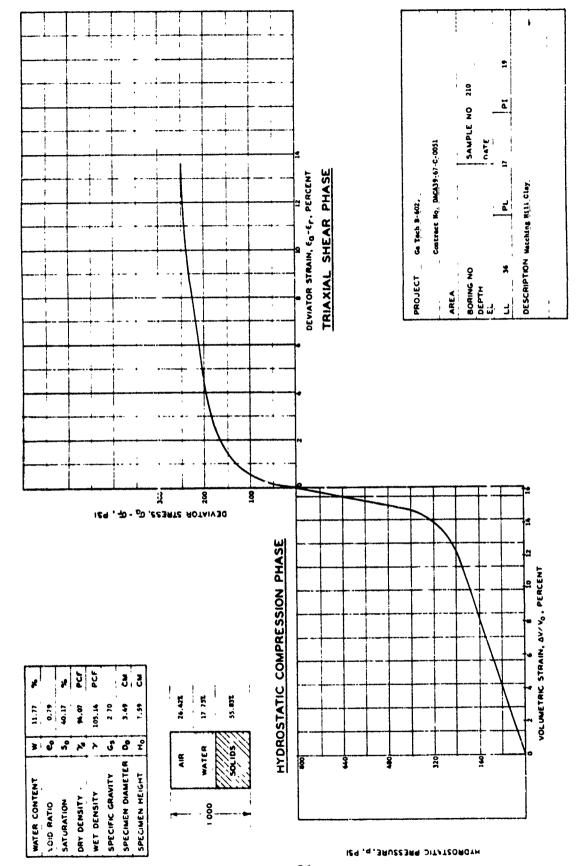


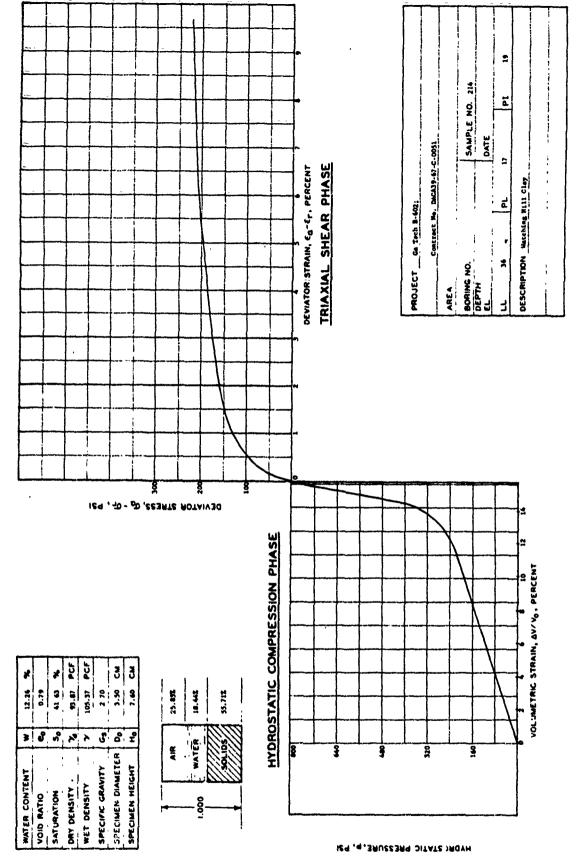




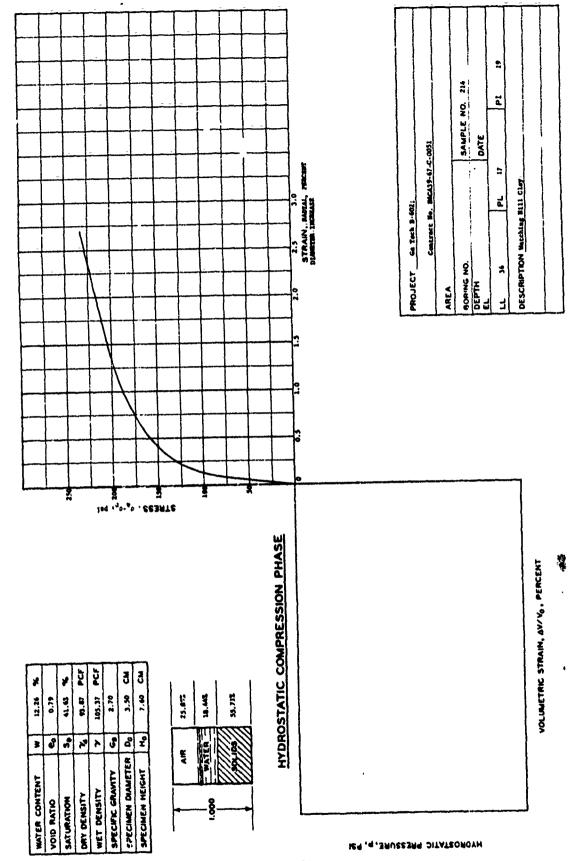


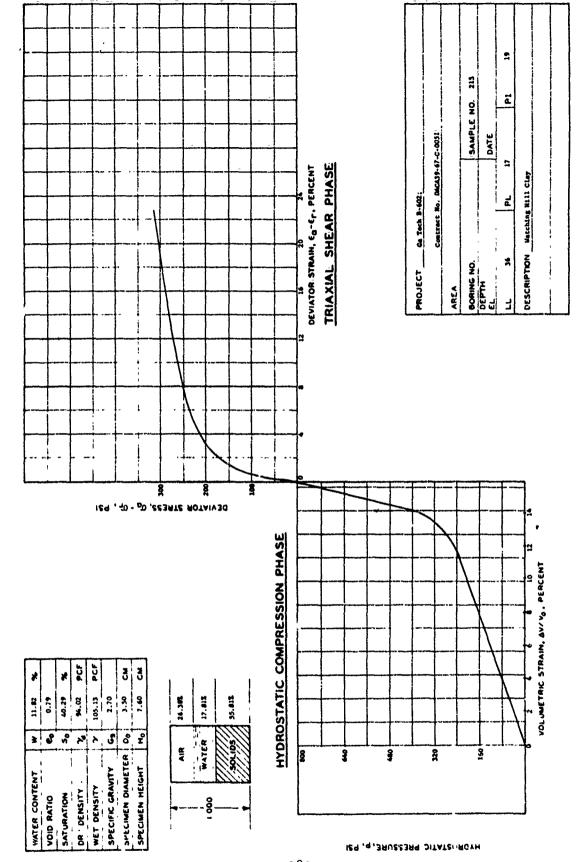


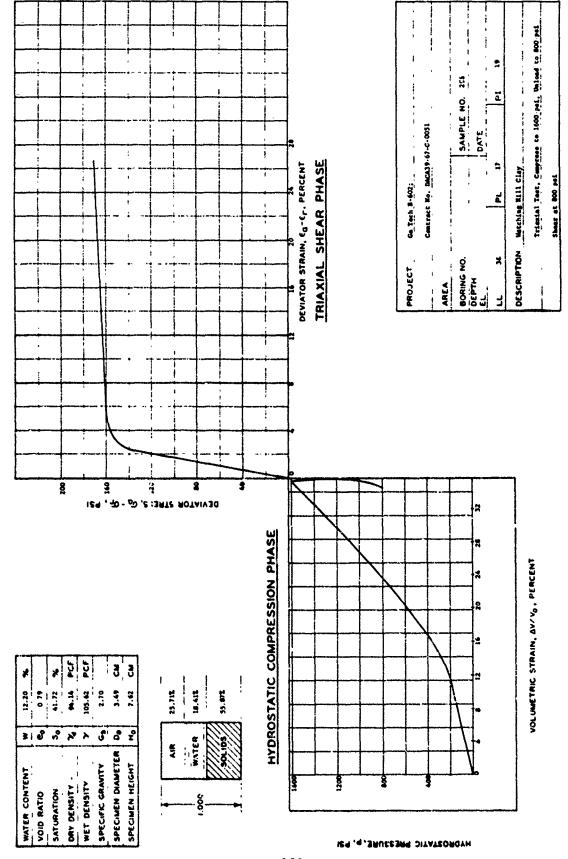


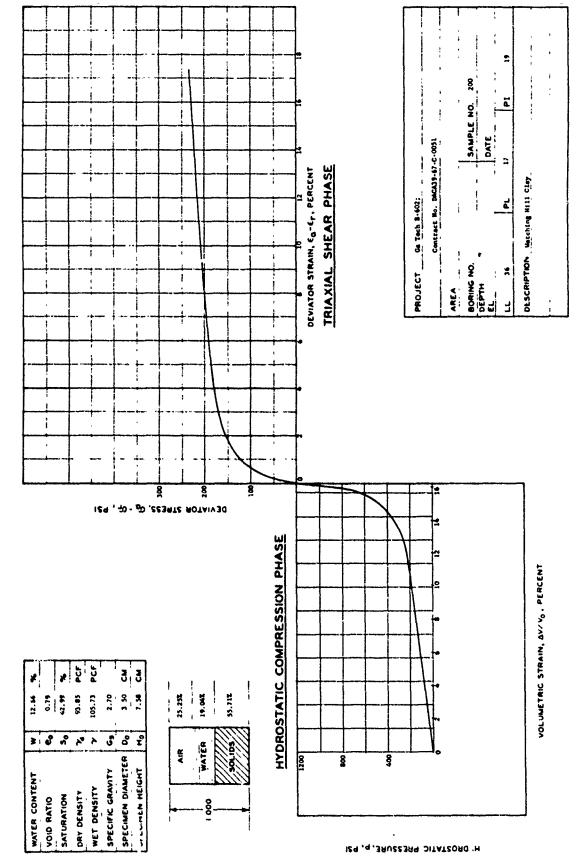


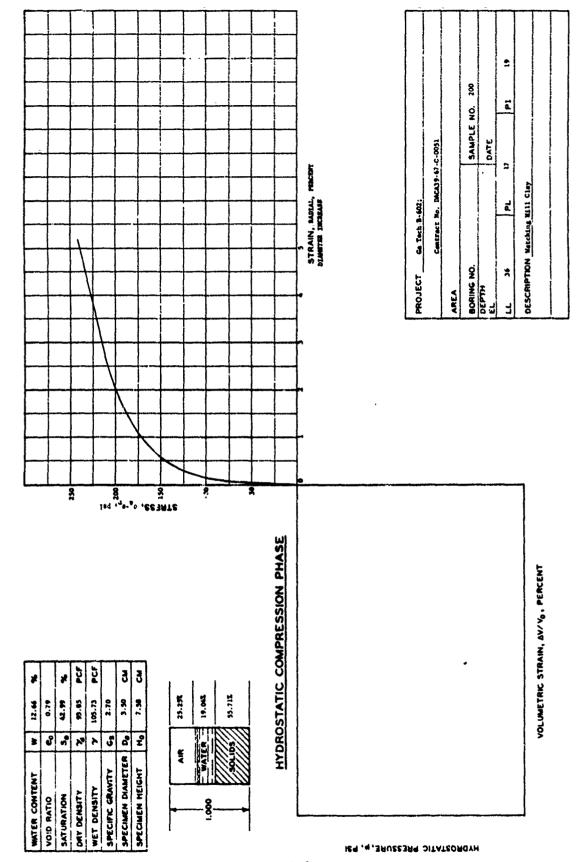
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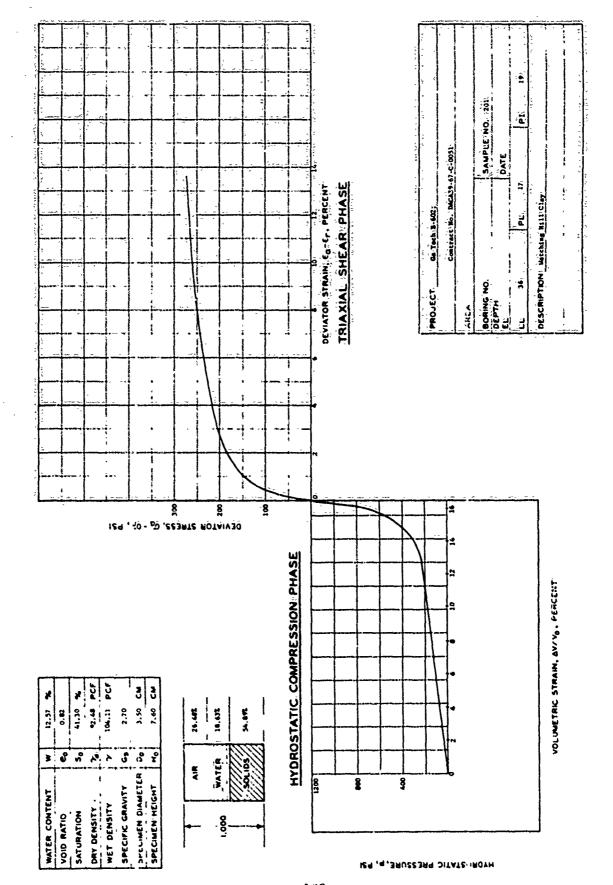


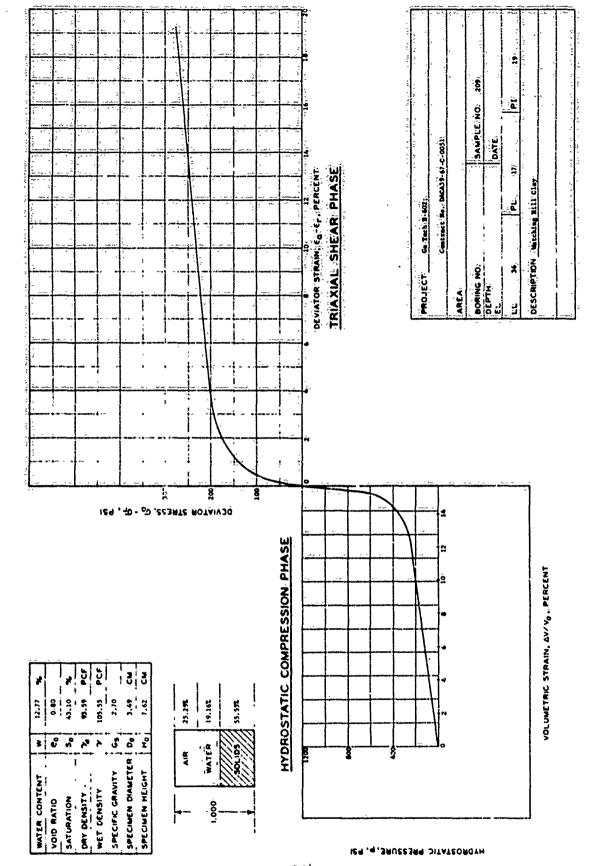


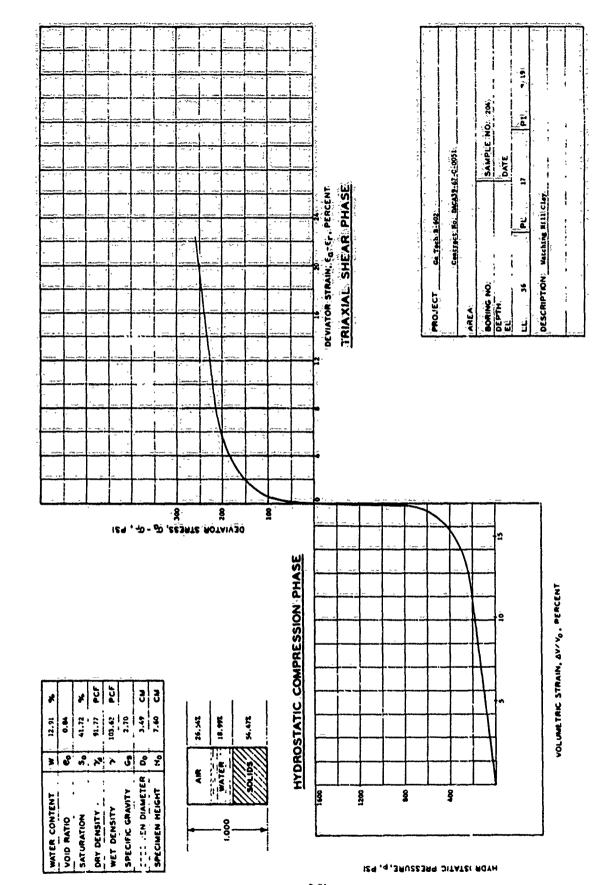




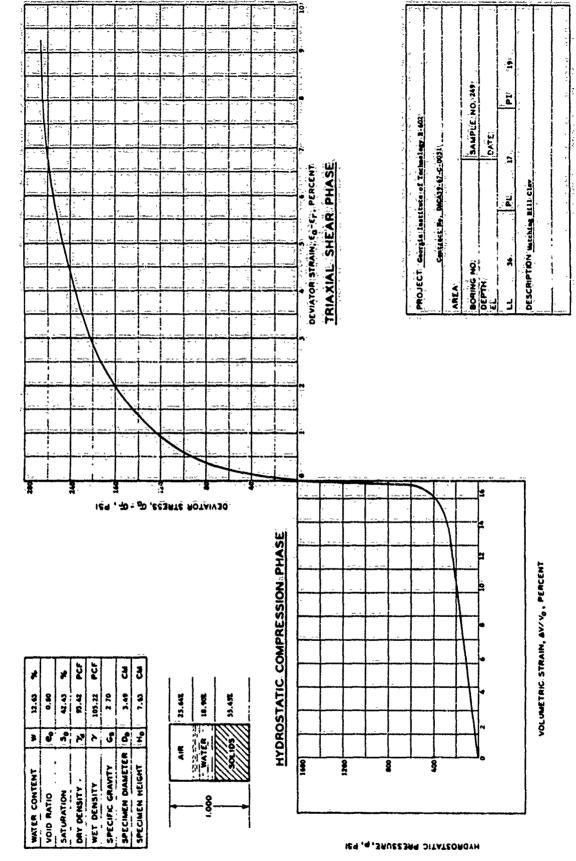
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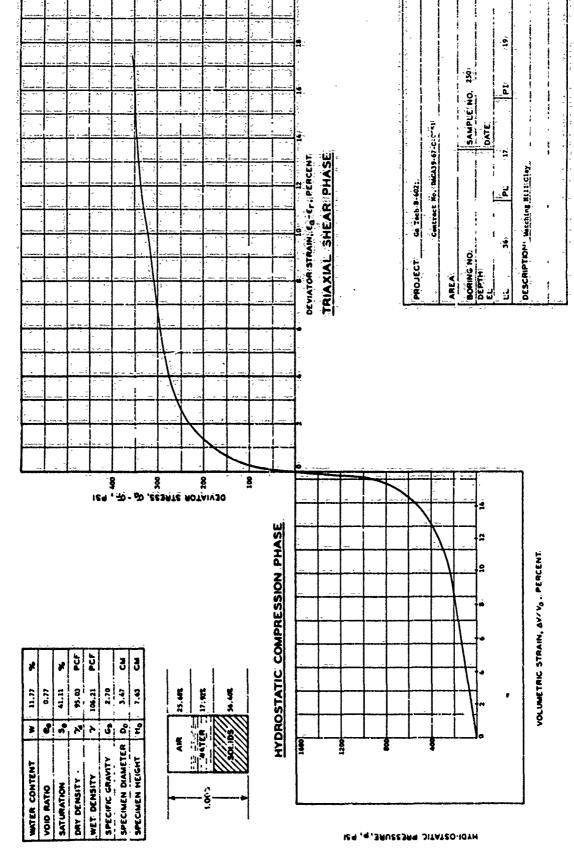




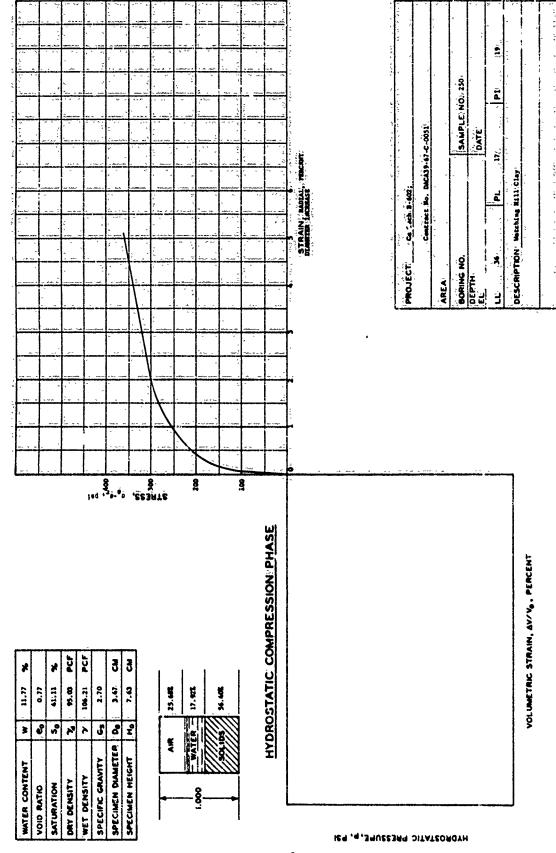


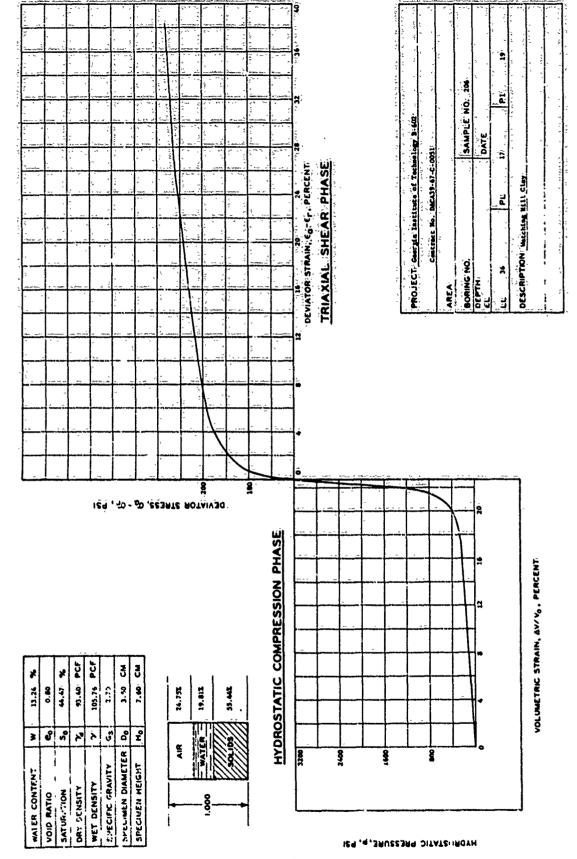
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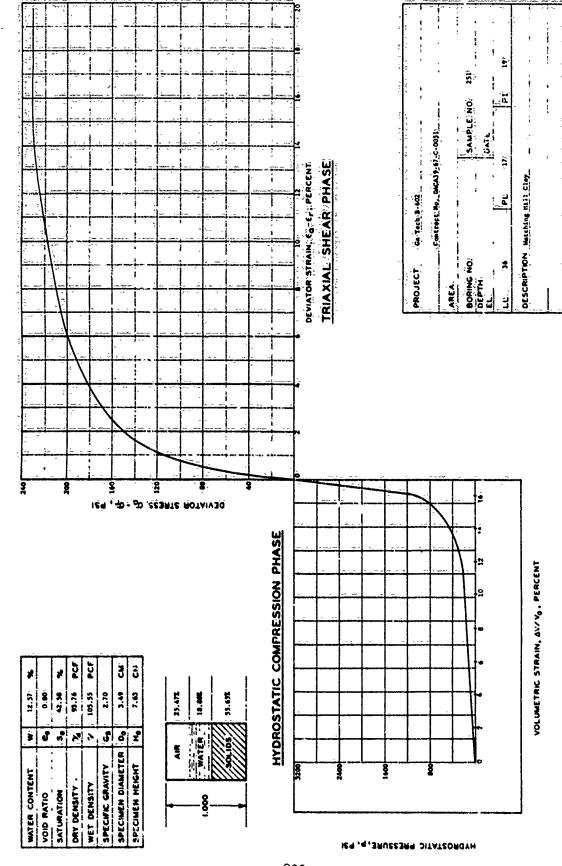


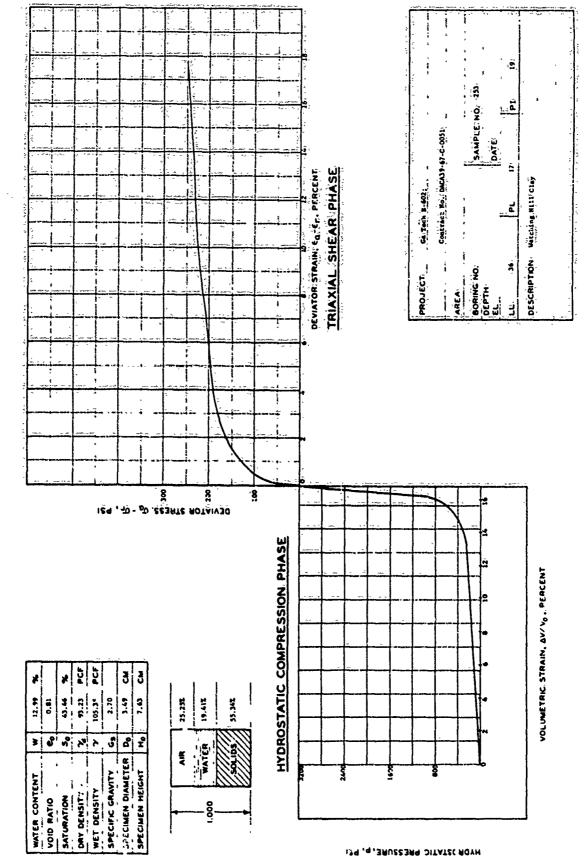


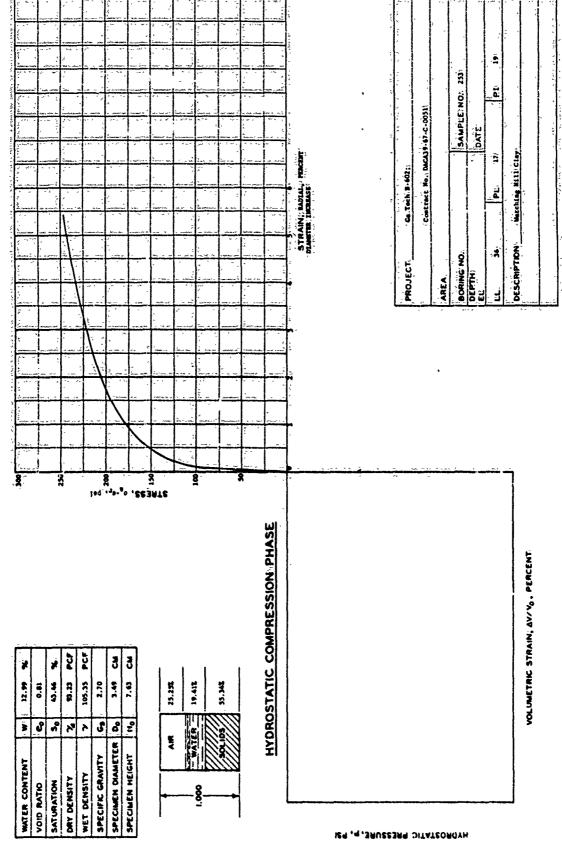
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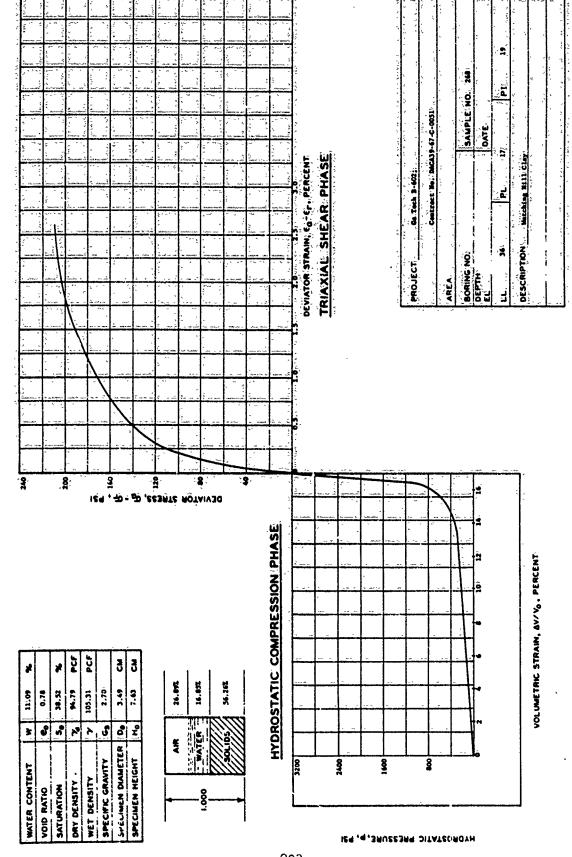


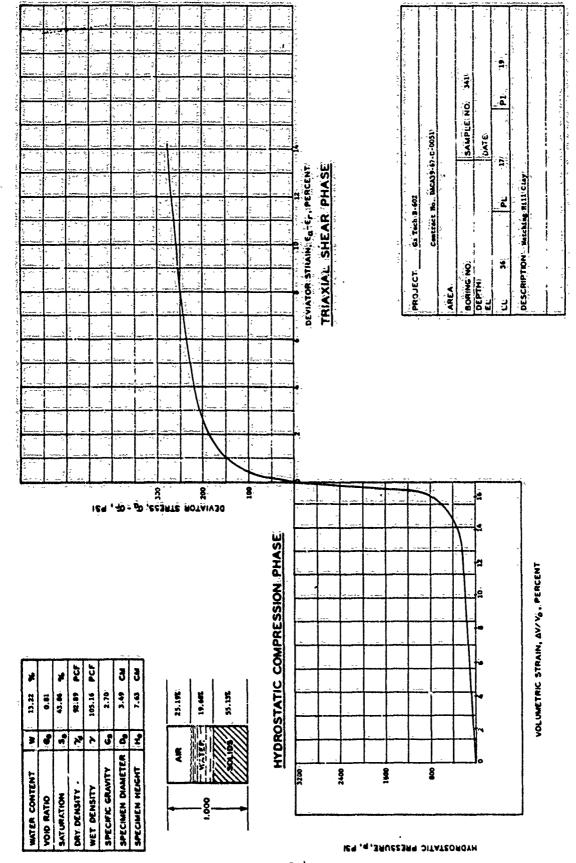


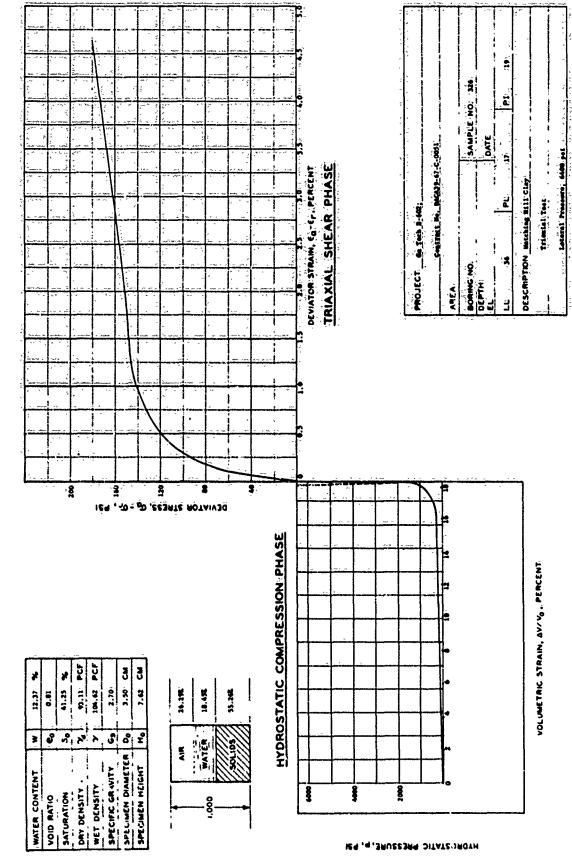


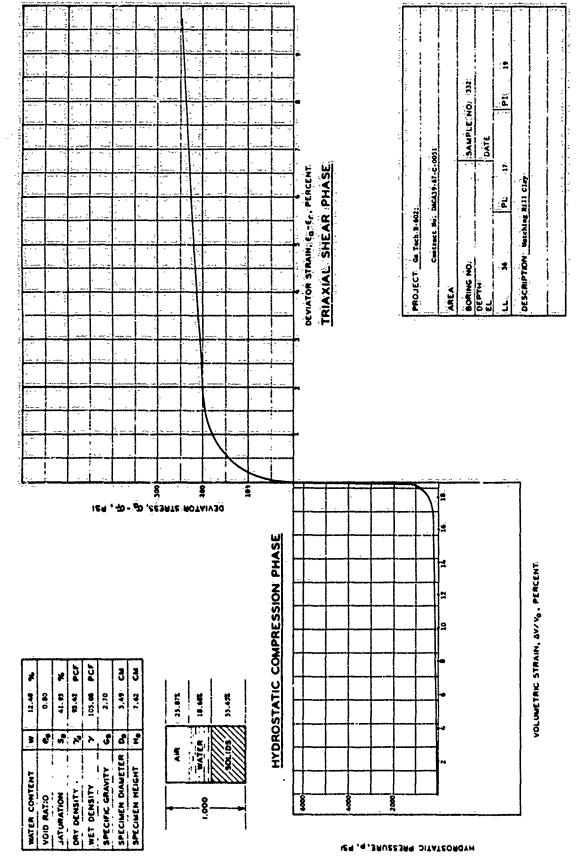


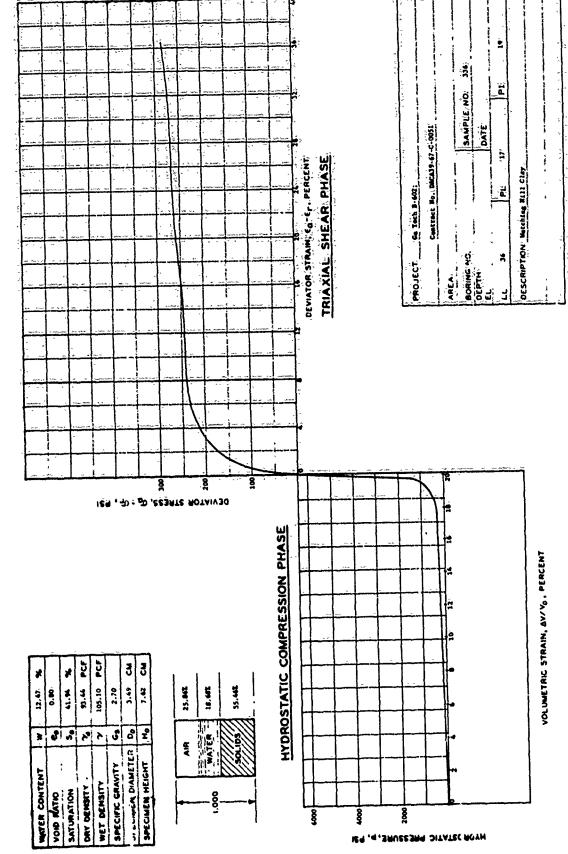




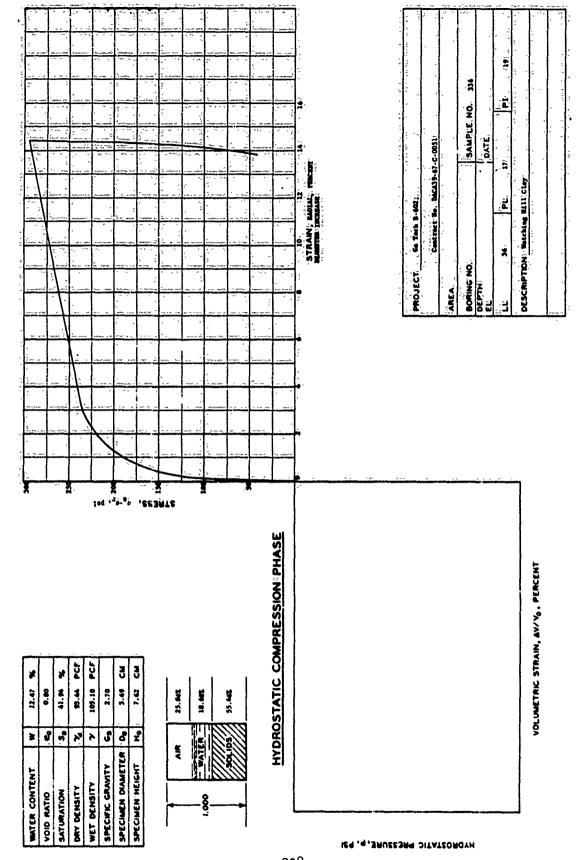


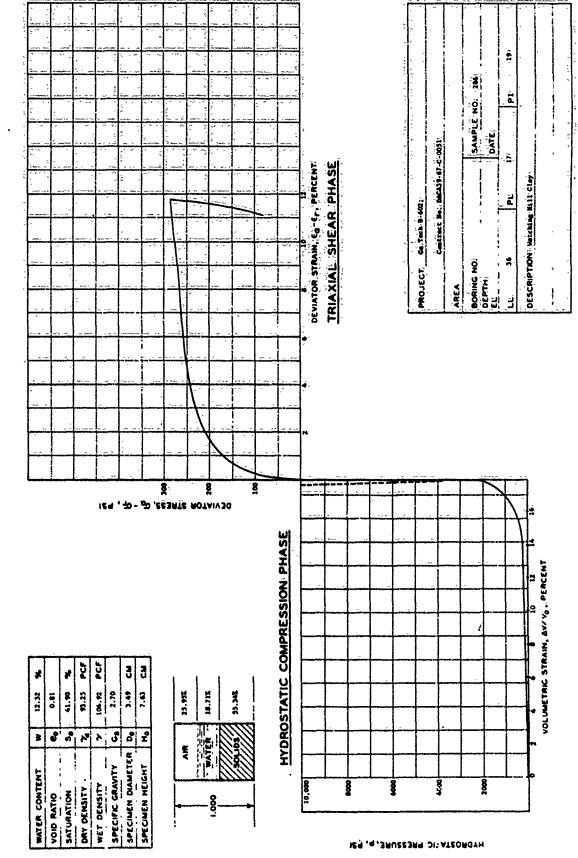




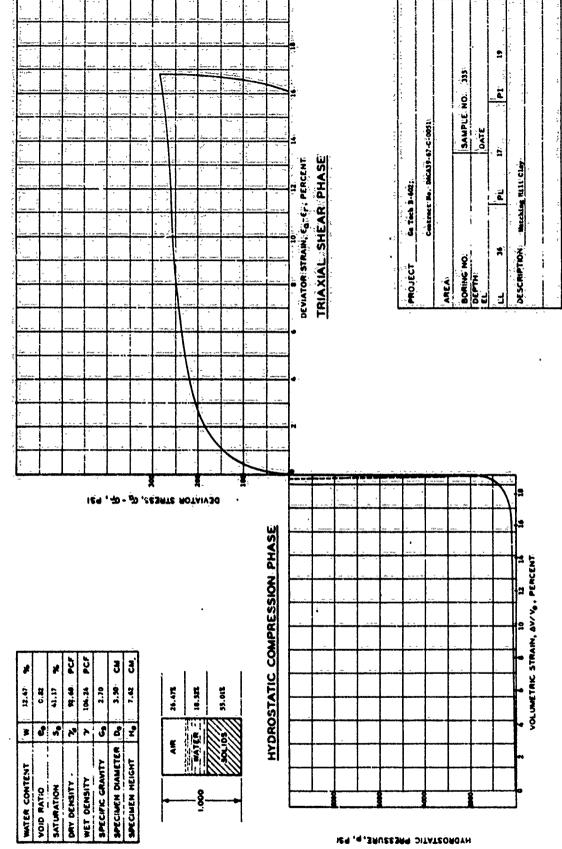


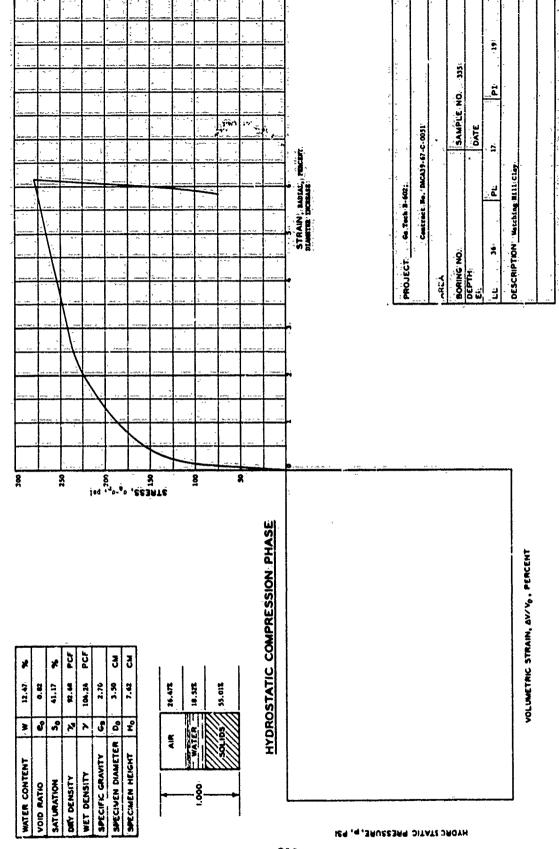
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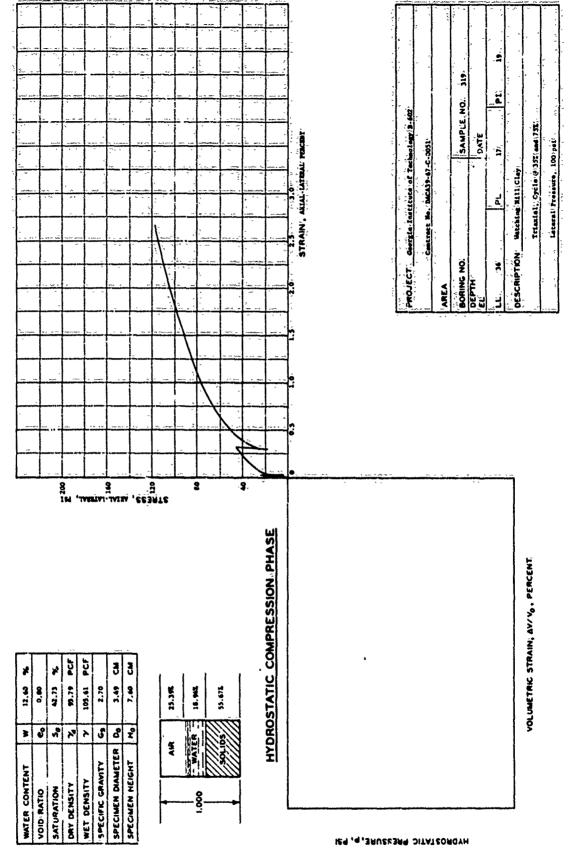
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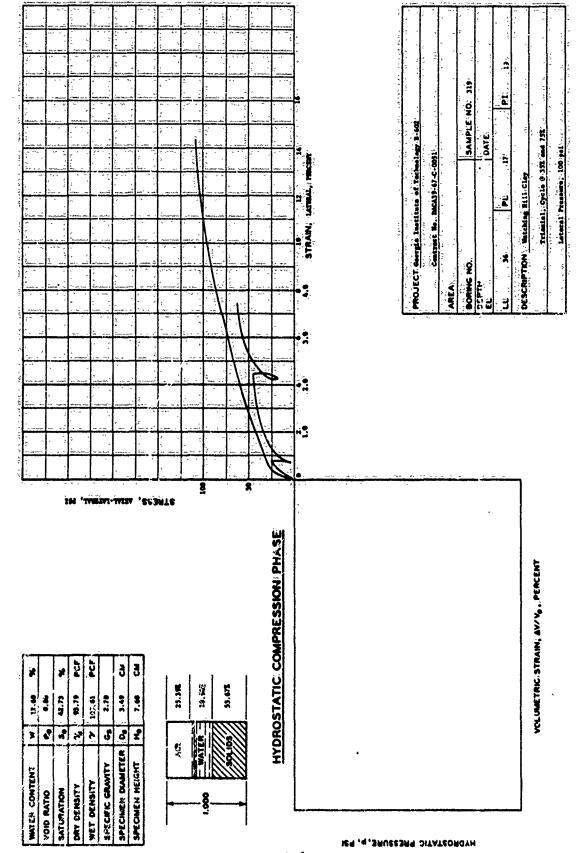
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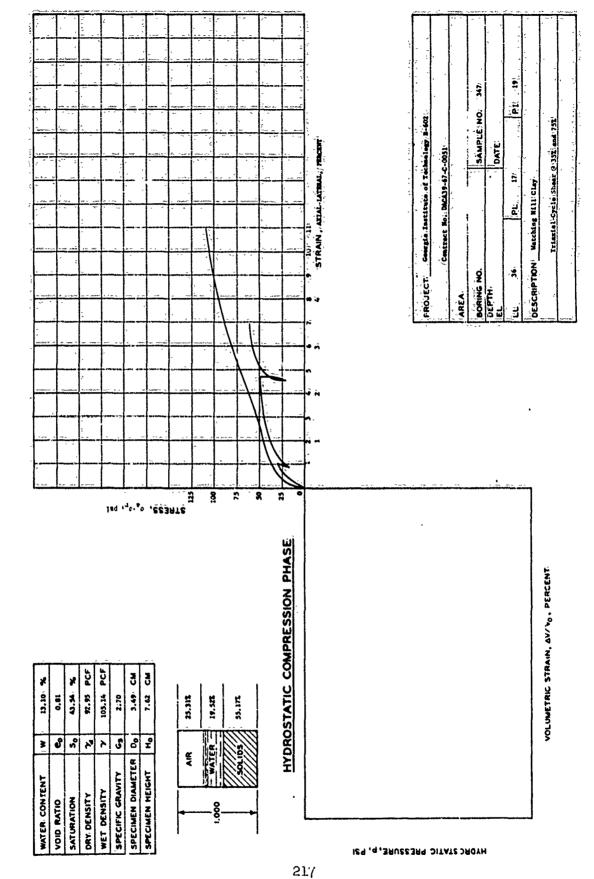
<u>Group B</u> Trinxial Tests, Cyclic



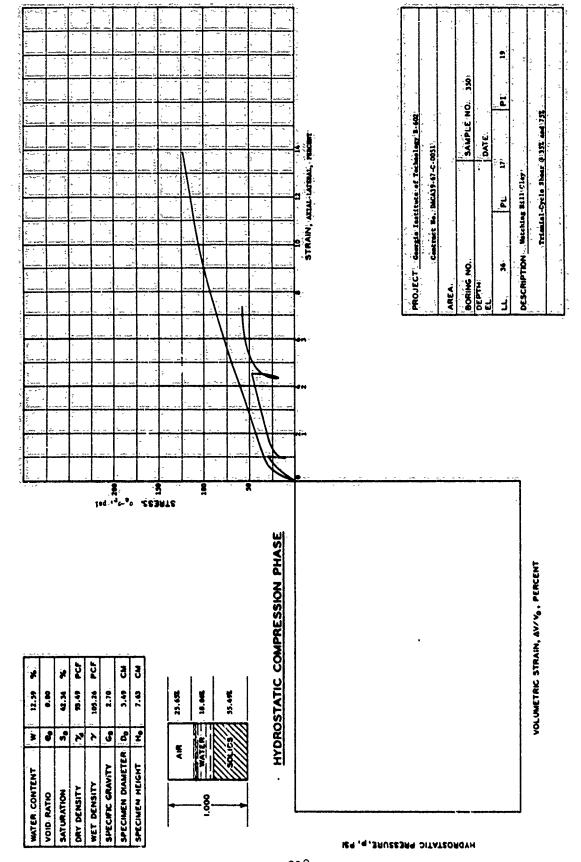
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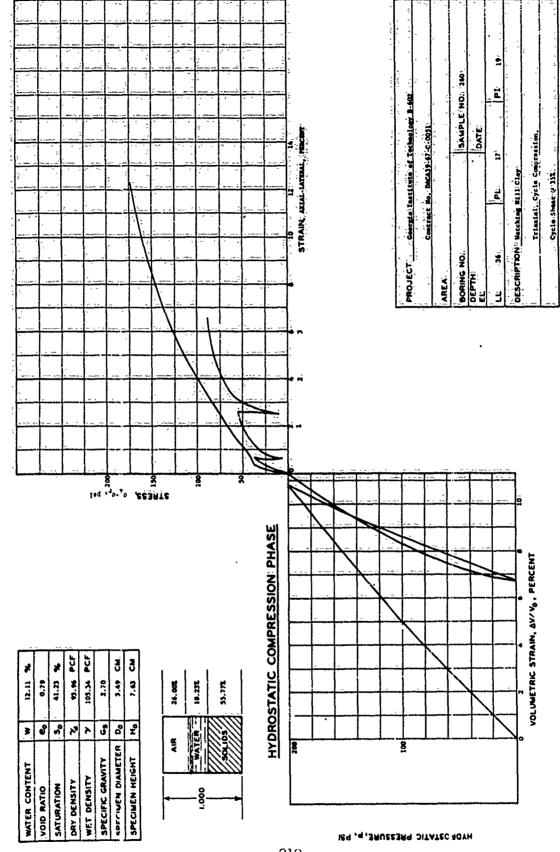
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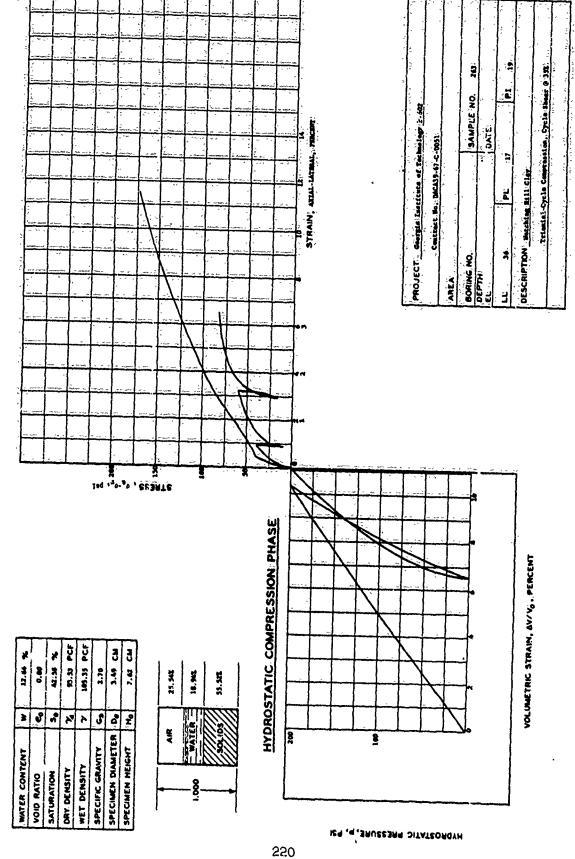


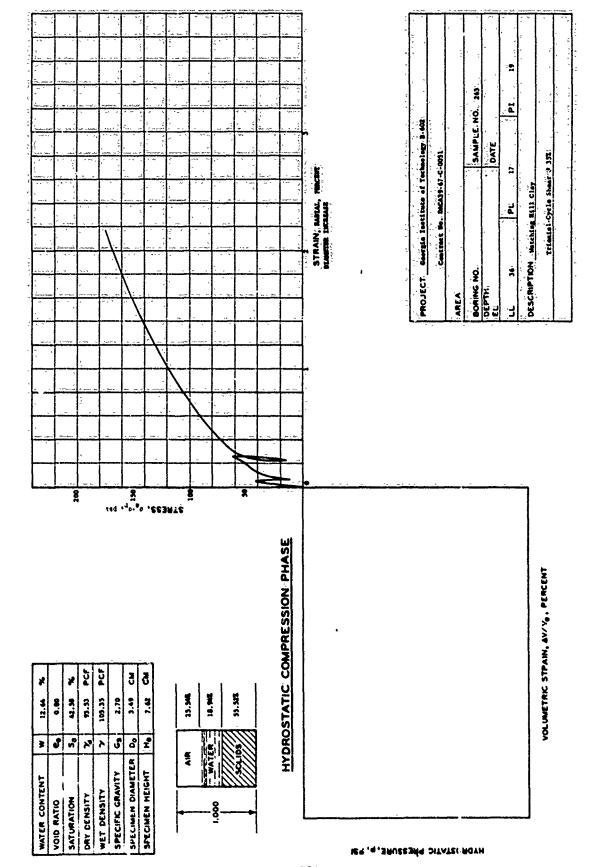
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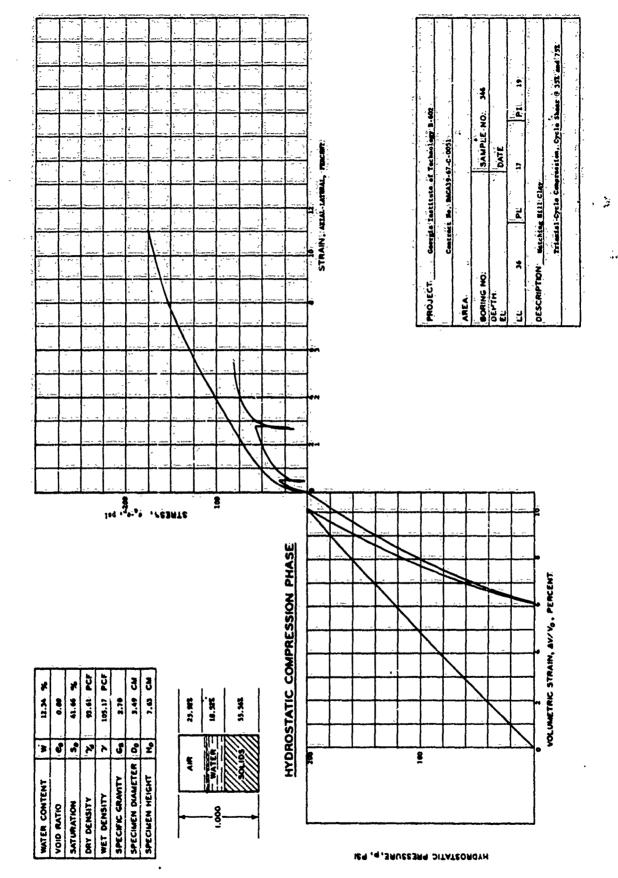


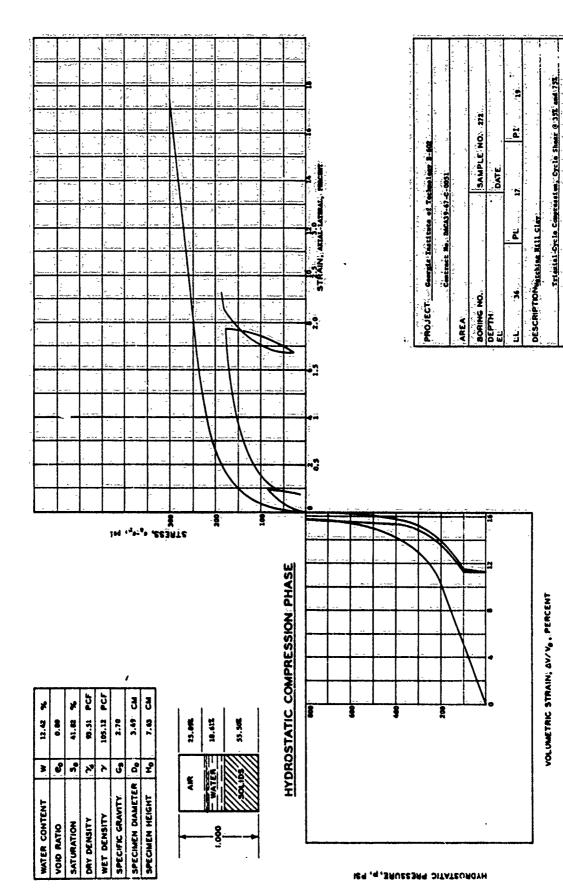


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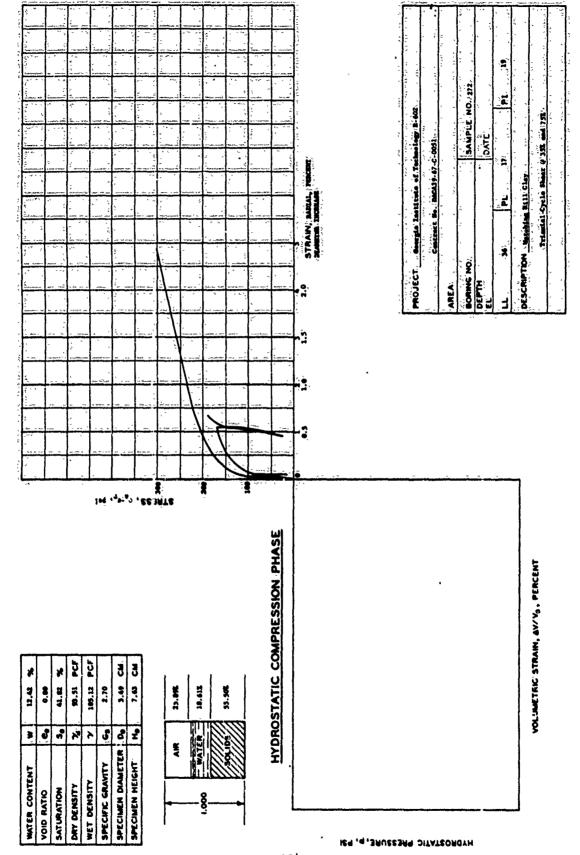


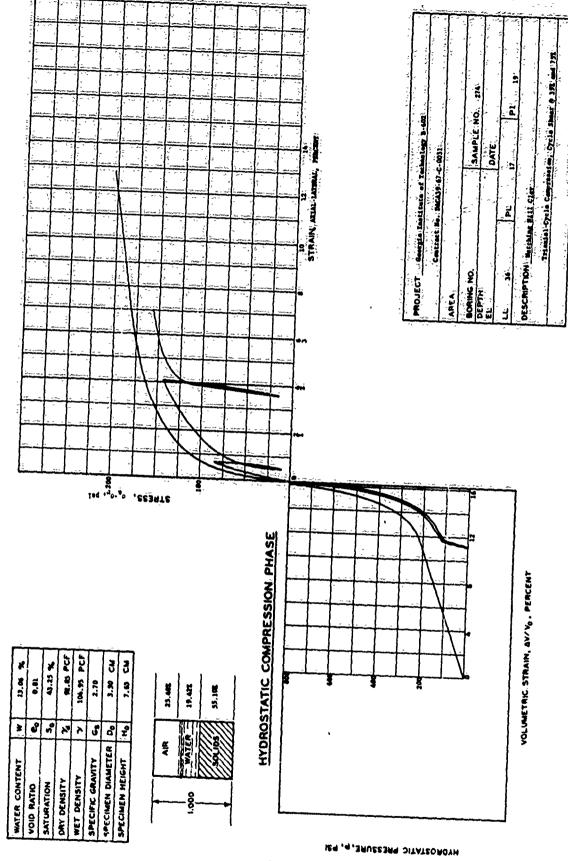


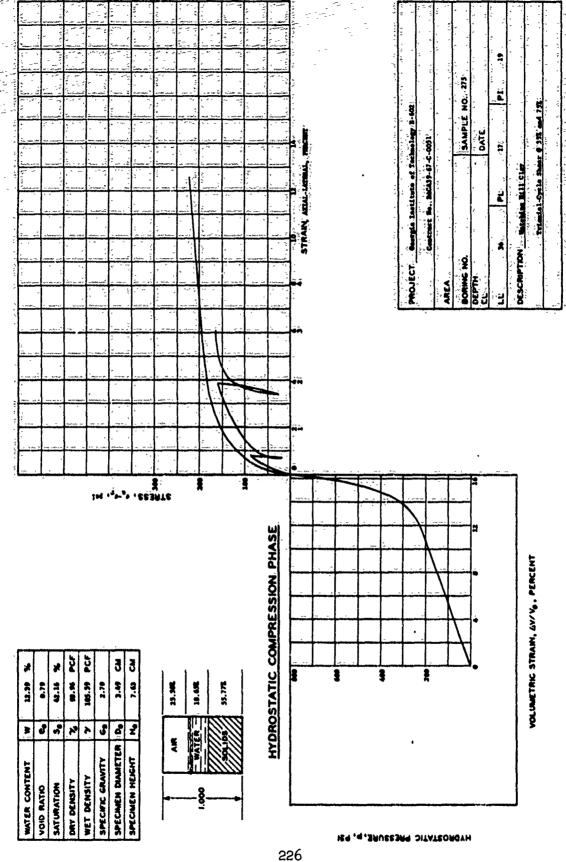


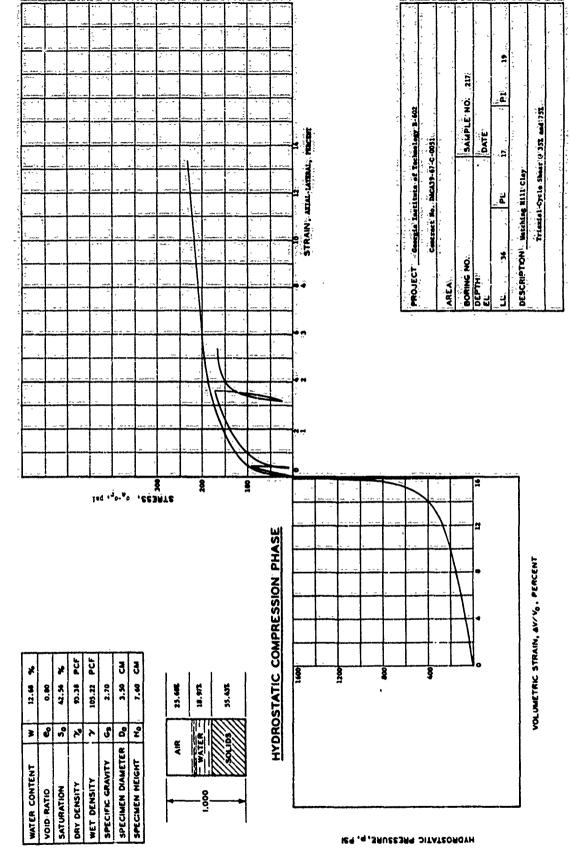


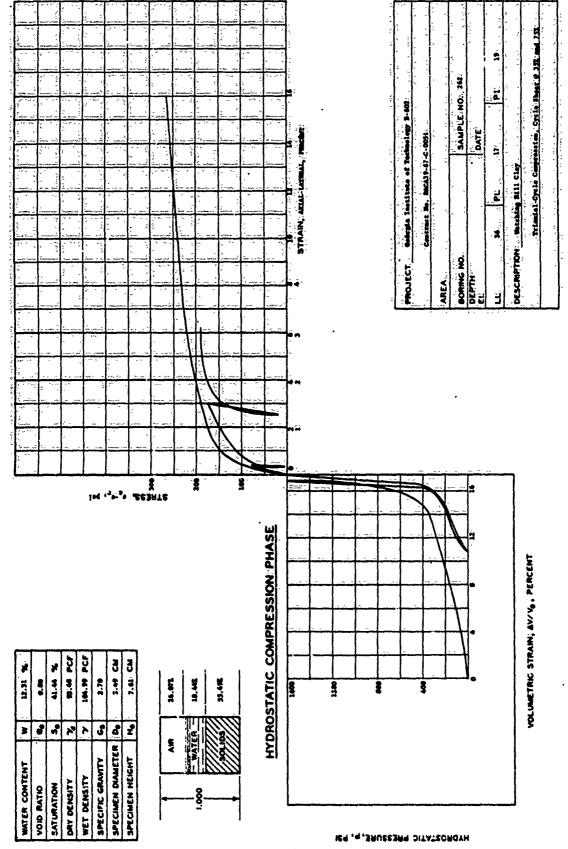
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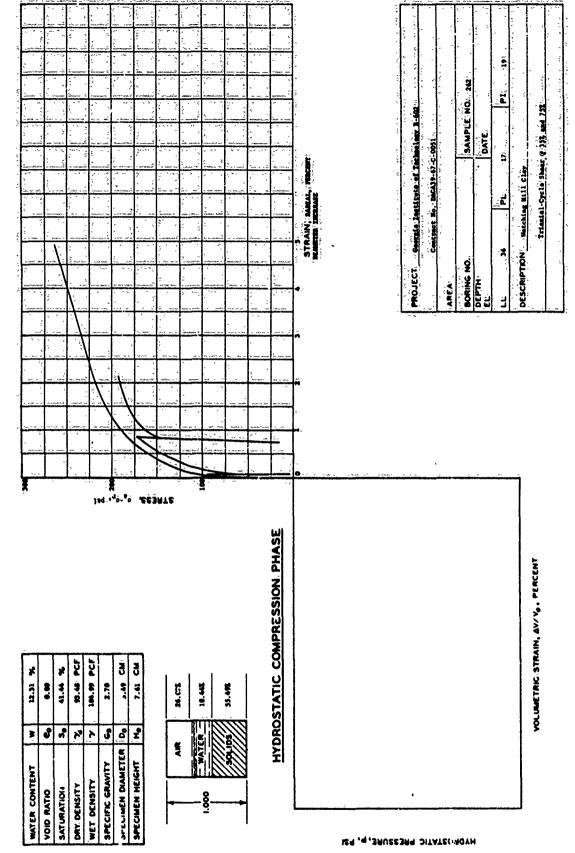


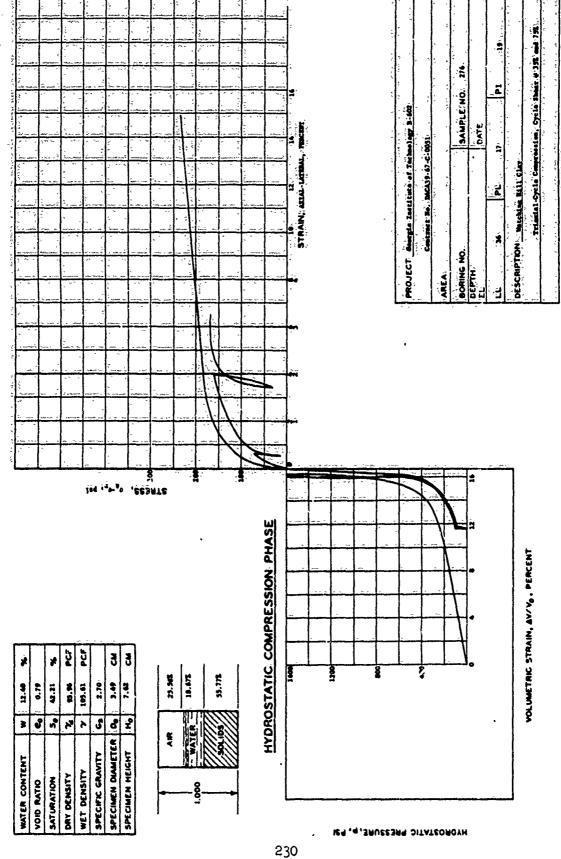


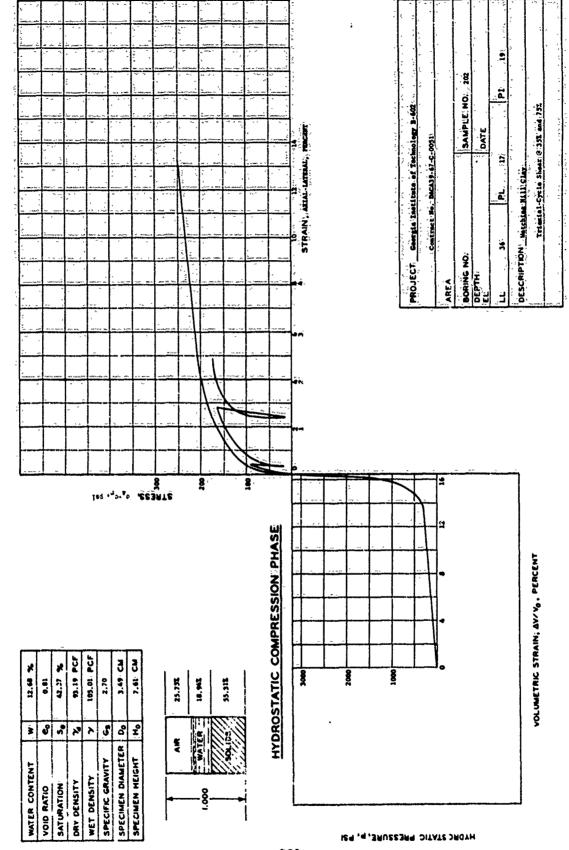


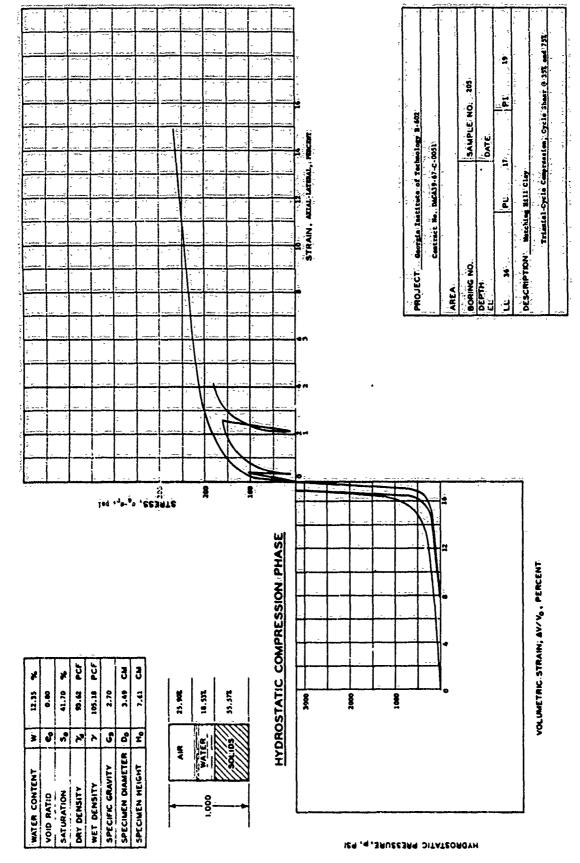


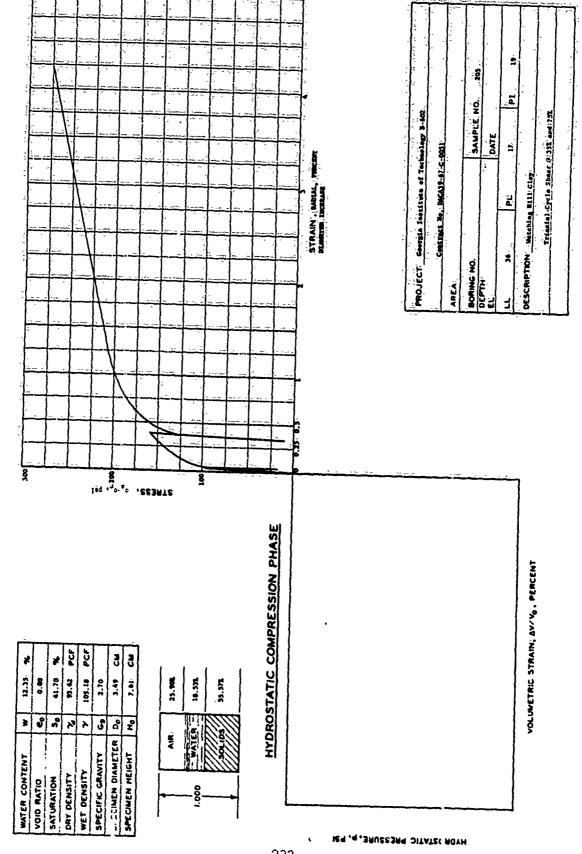


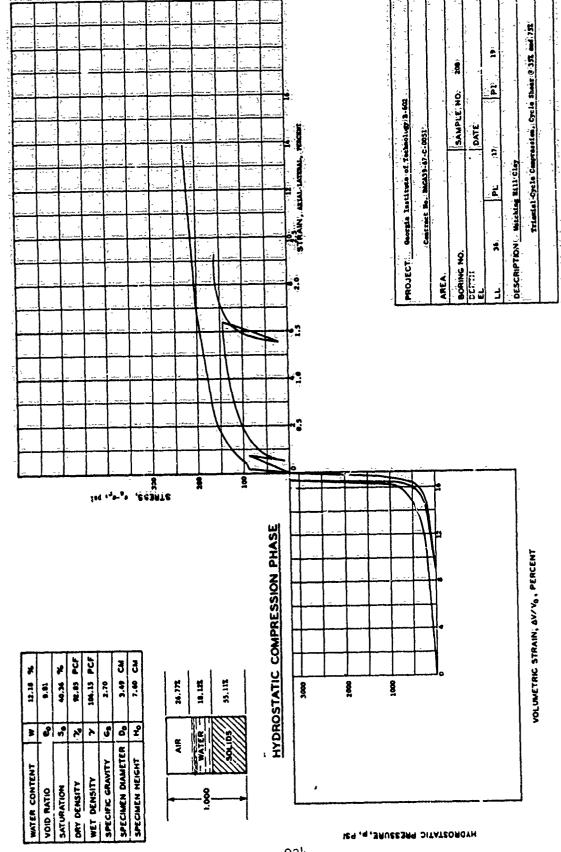


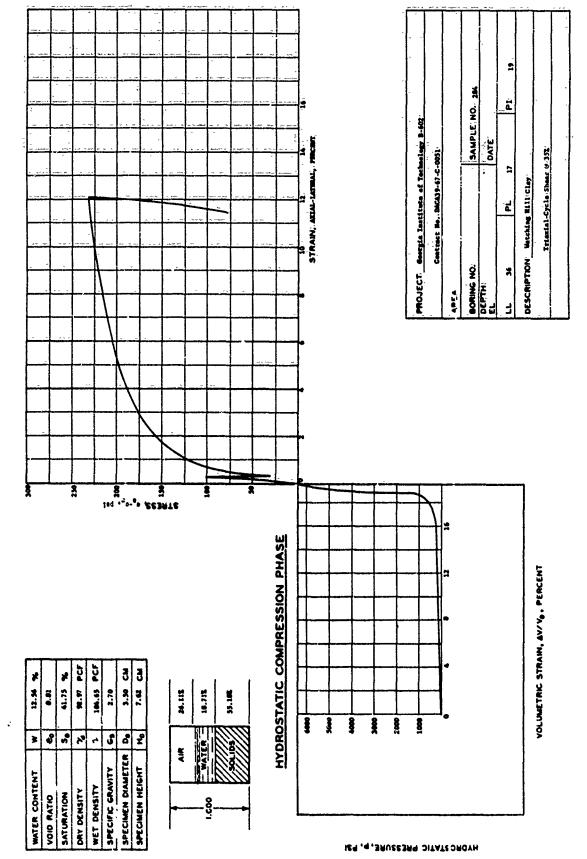


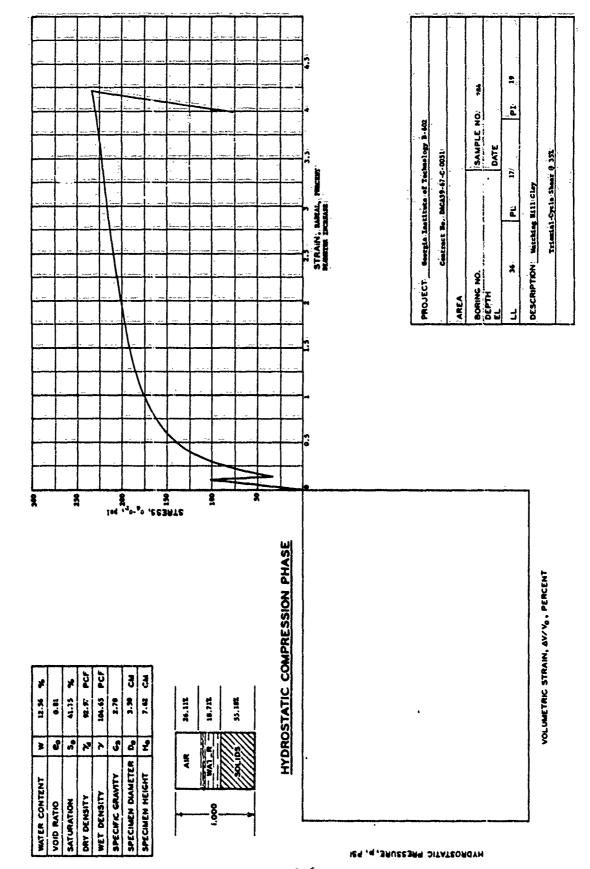


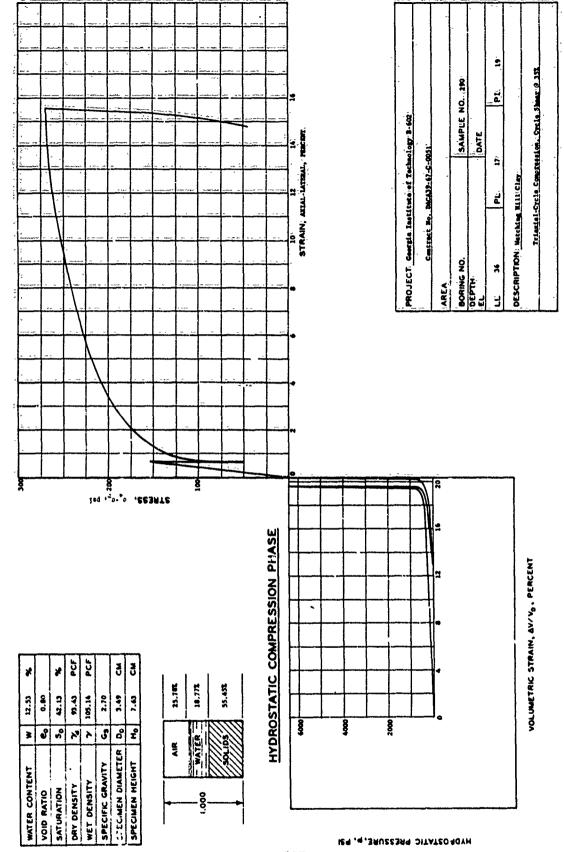




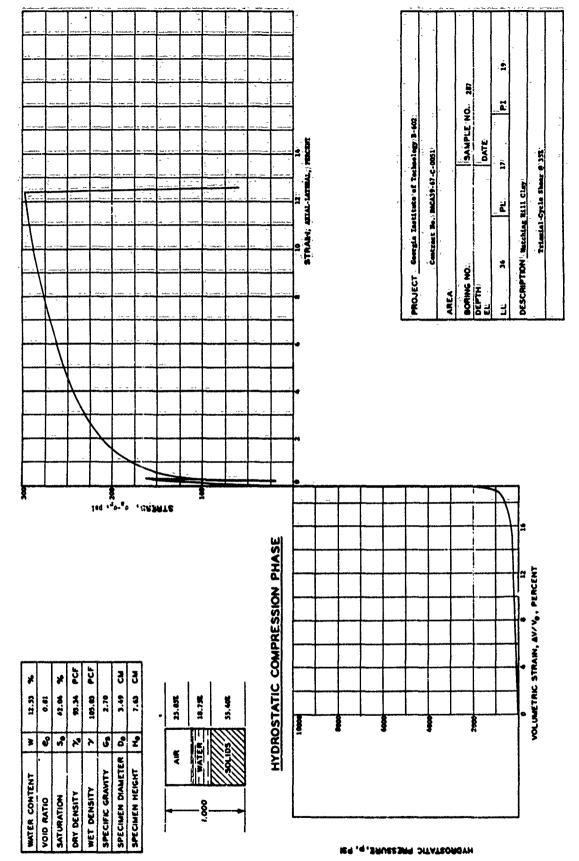


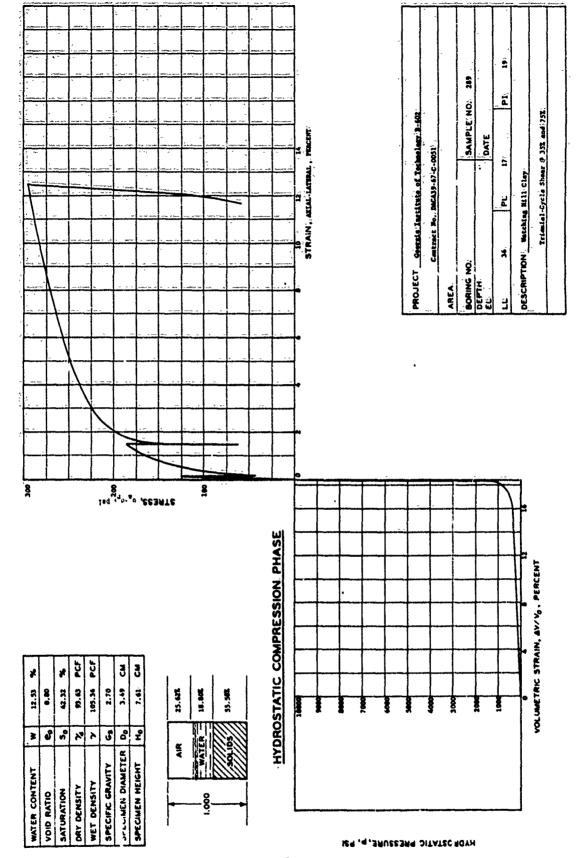


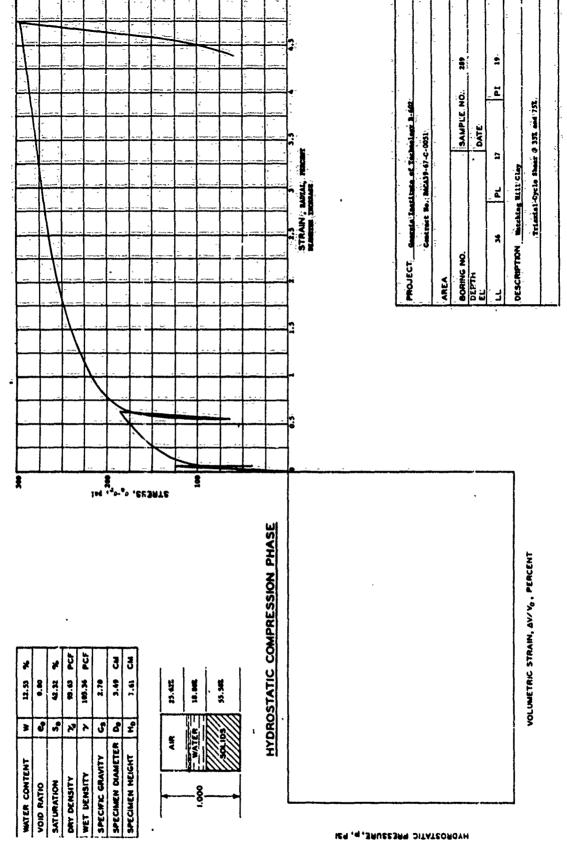


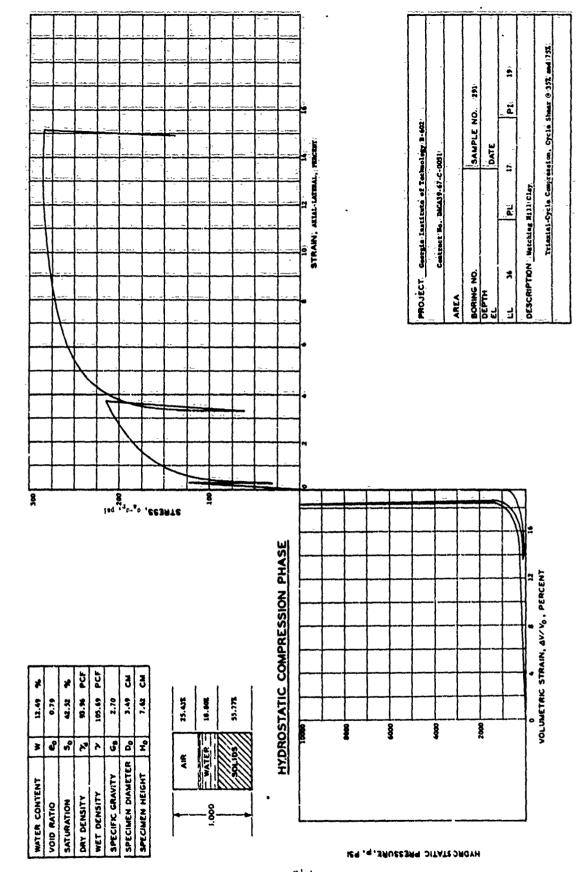


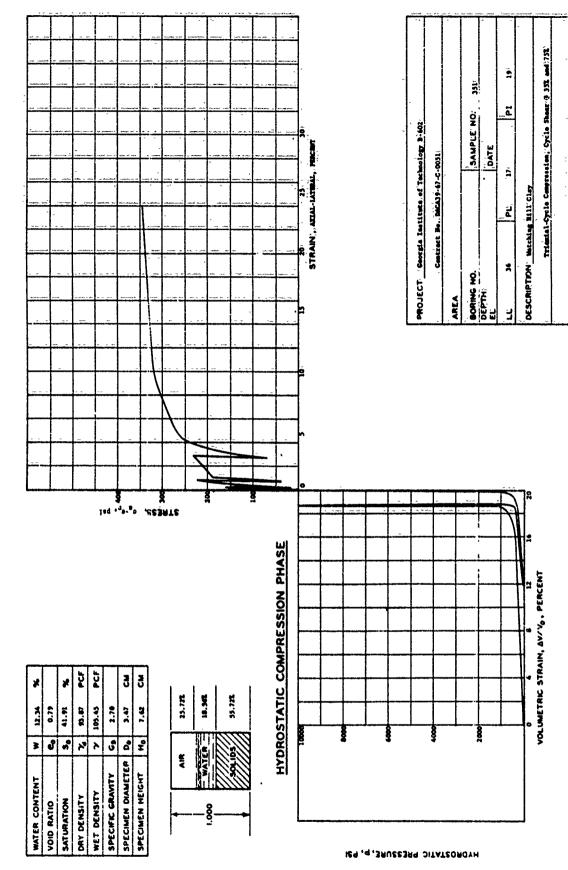
是一个人,我们是一个人,我们也是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一





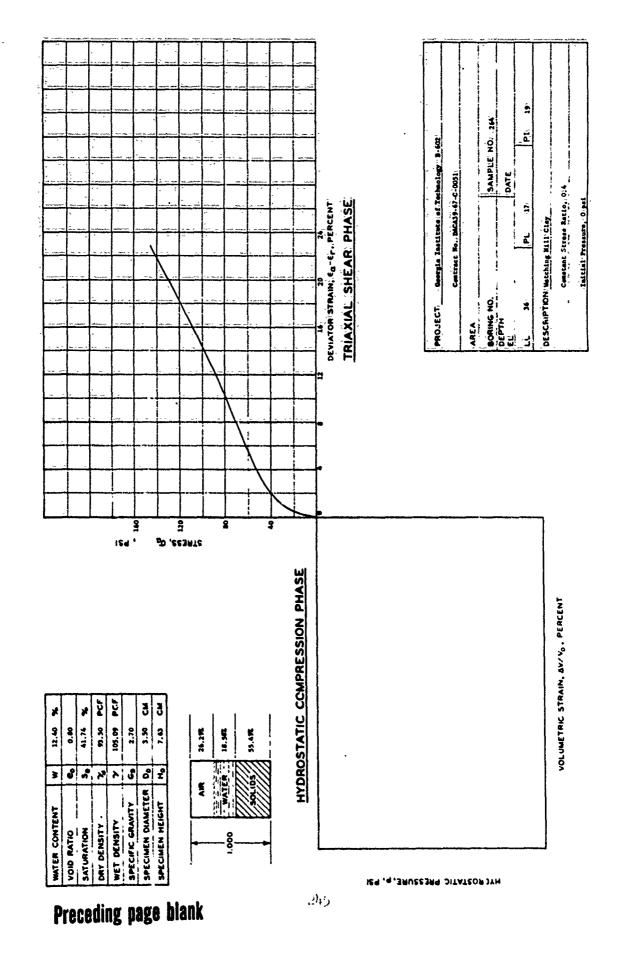


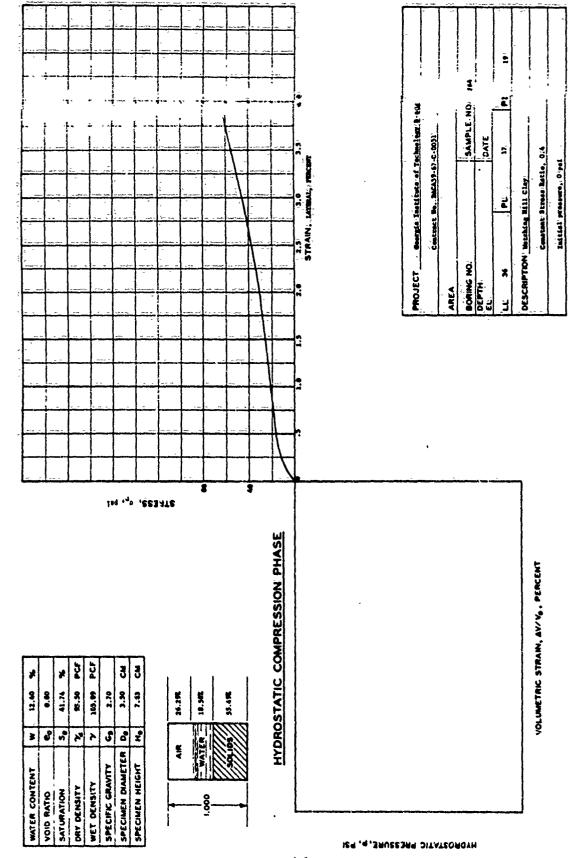


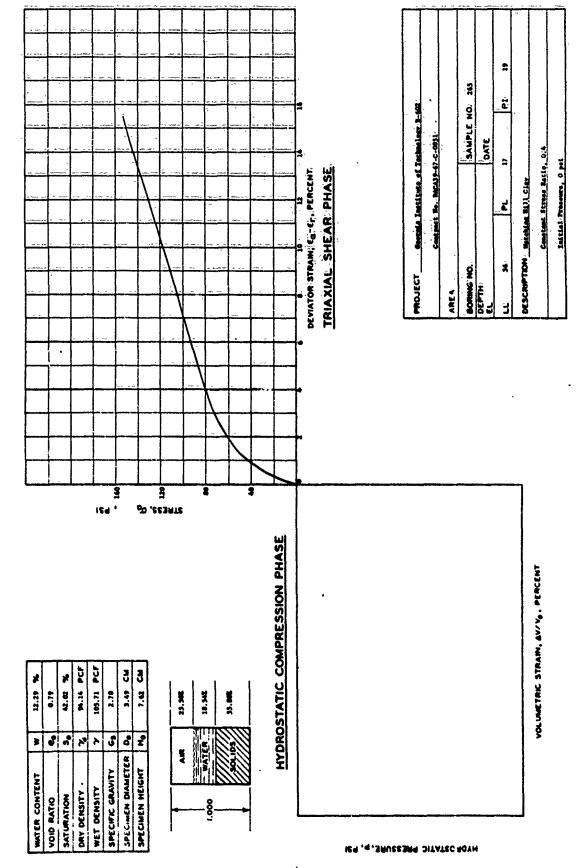


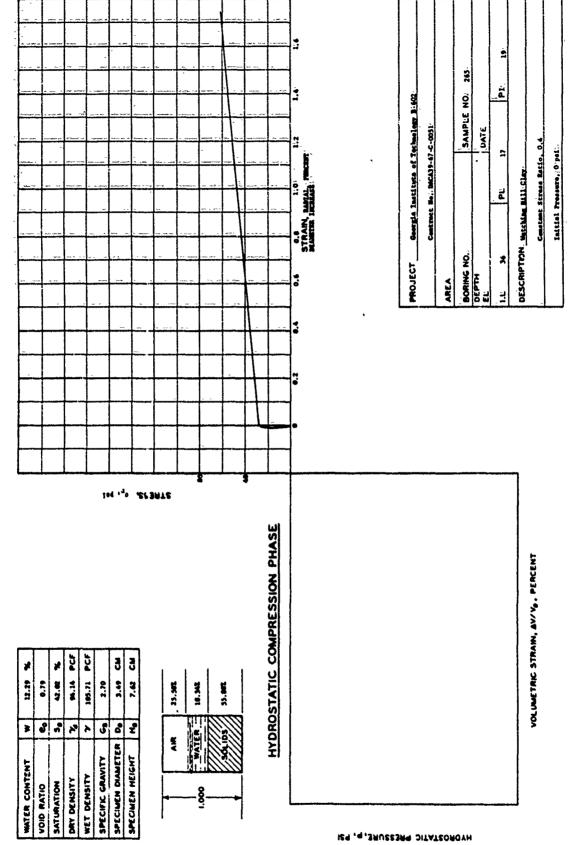
Group C

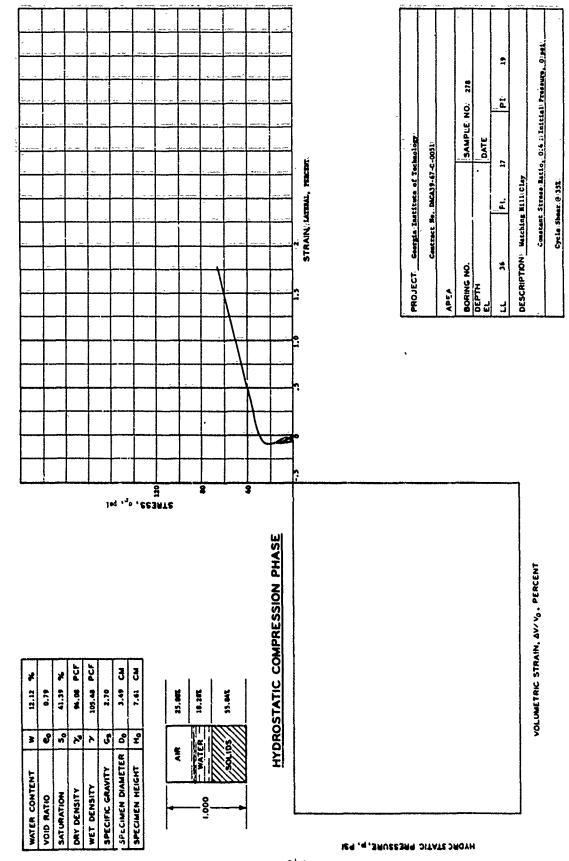
Constant Ratio Tests







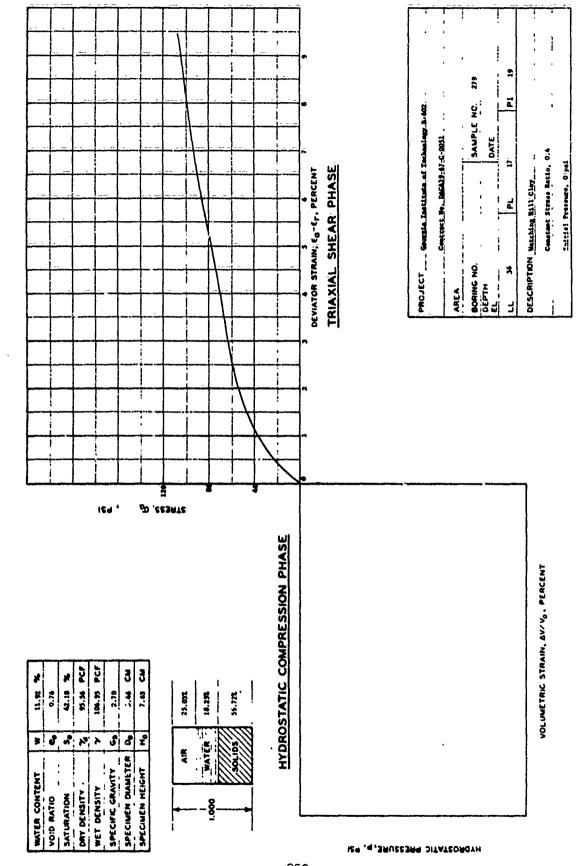




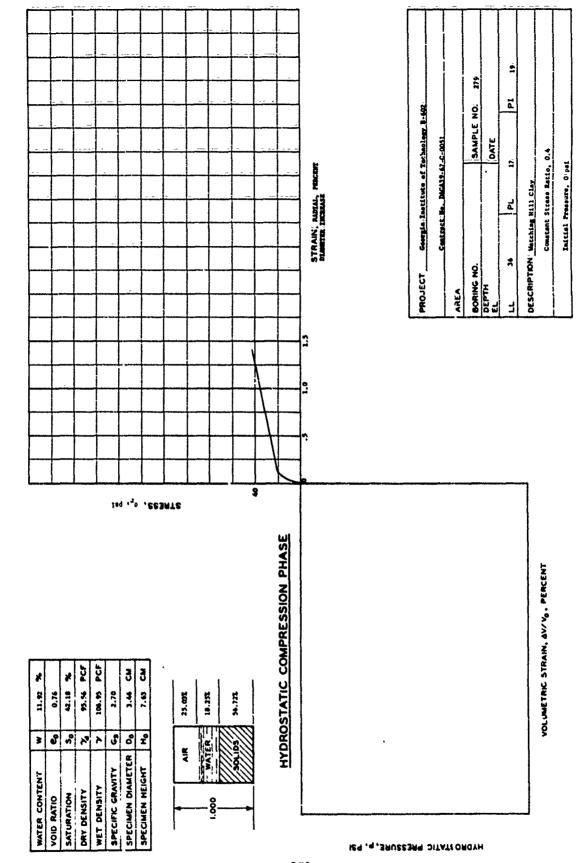
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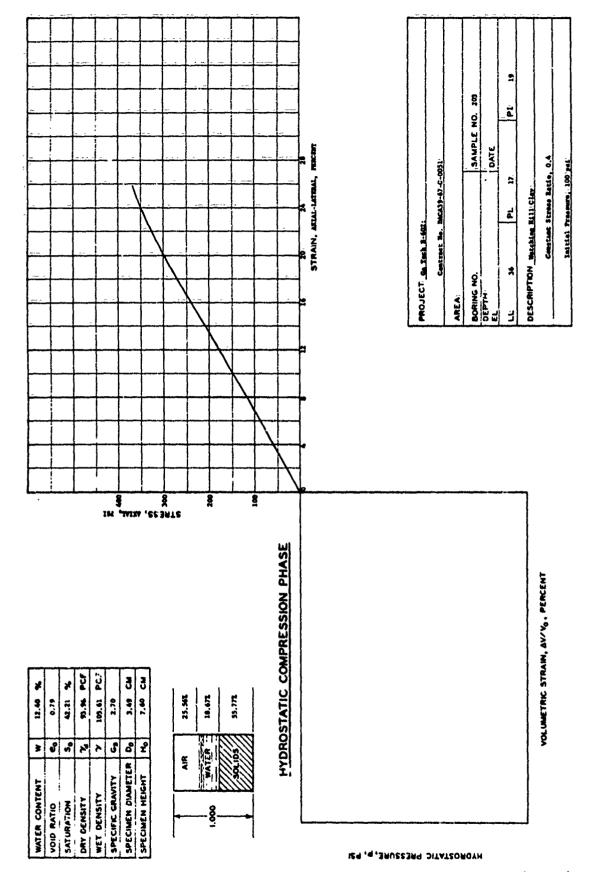
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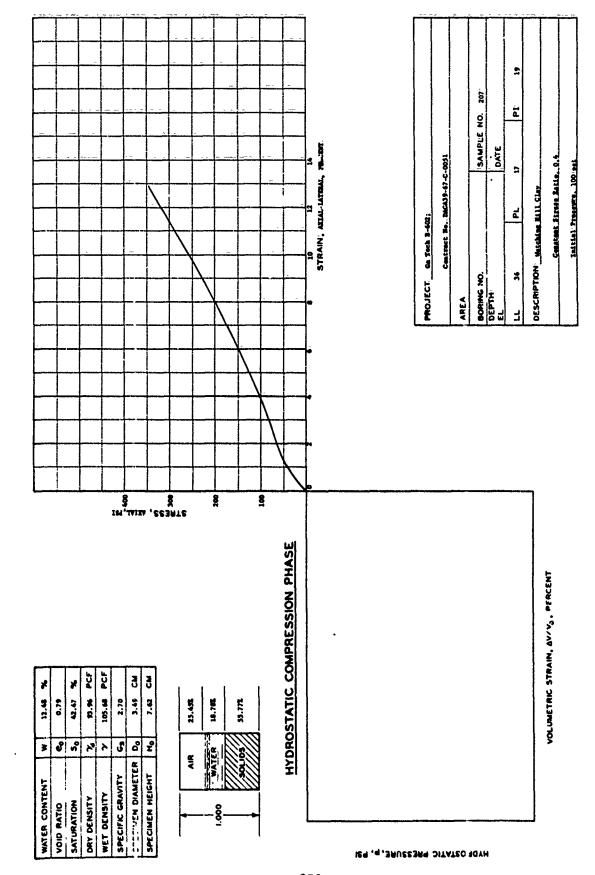


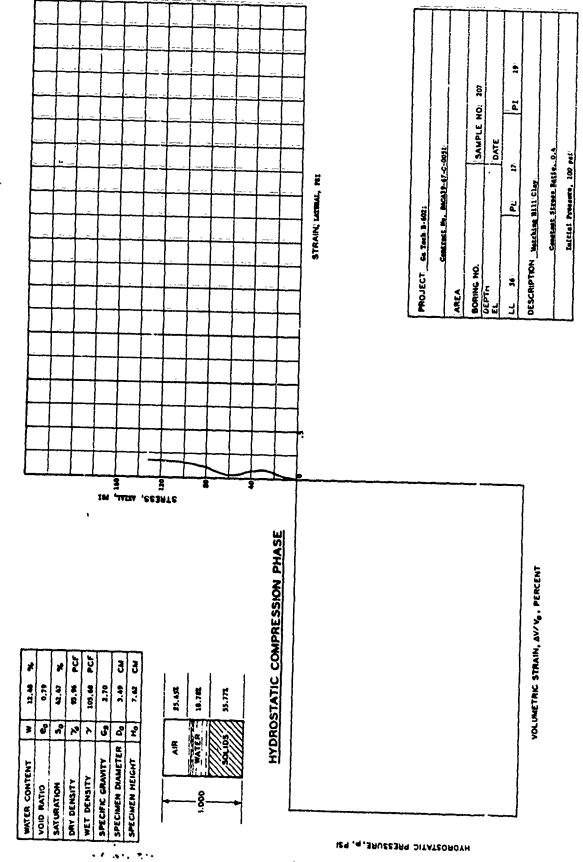
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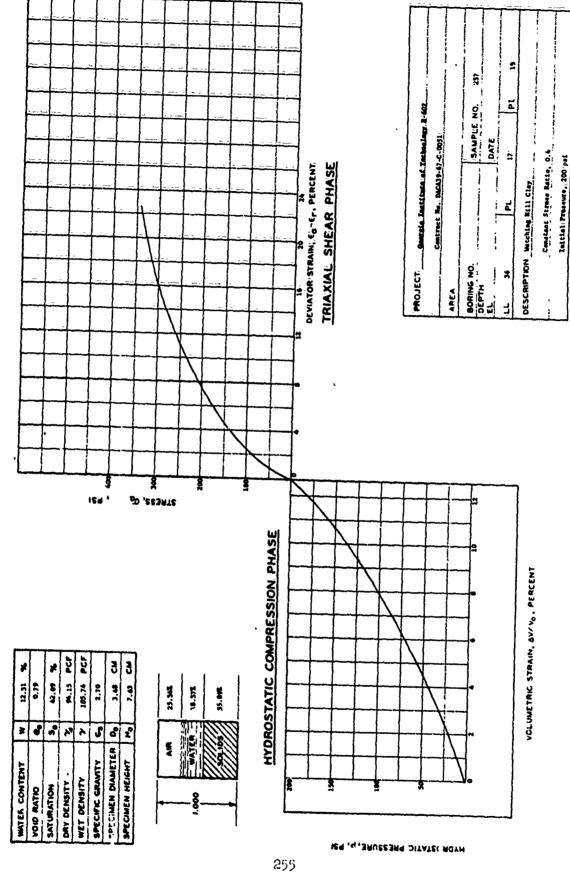


在我们的人,我们也不是一个人的人,我们也不是一个人的人,我们就是一个人的人,我们也不是一个人的人,我们也不是一个人的人,我们也不是一个人的人,我们也会会会会会会





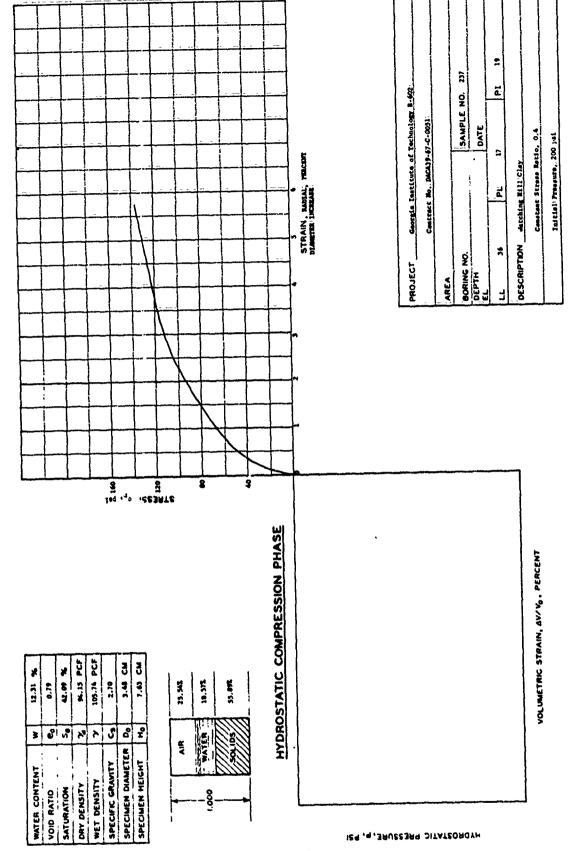


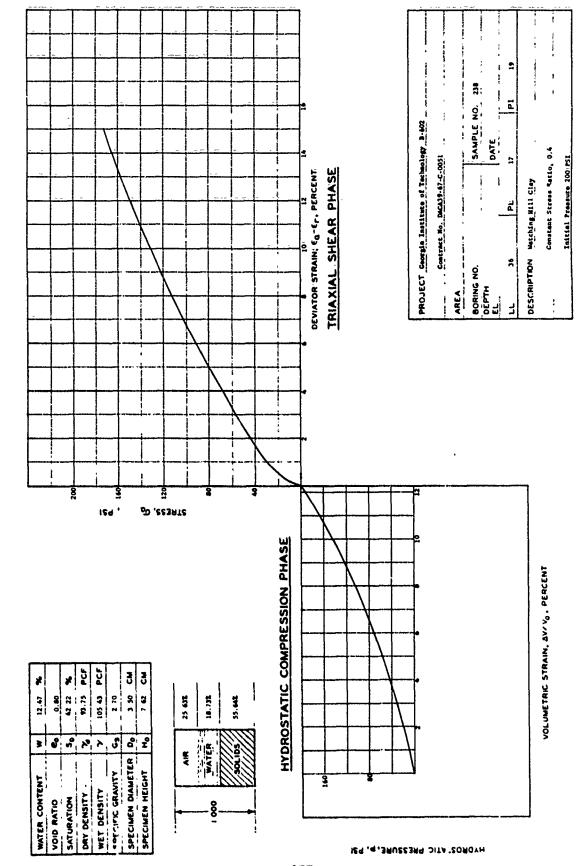


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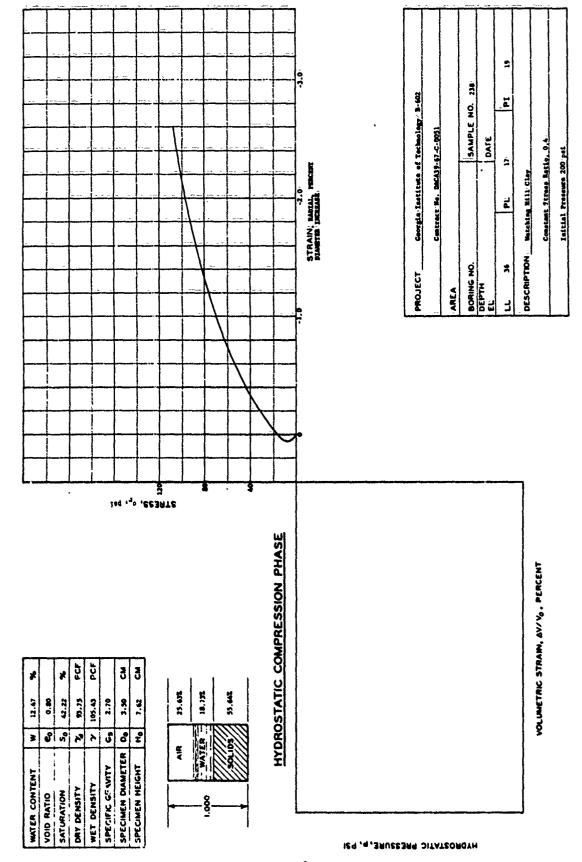
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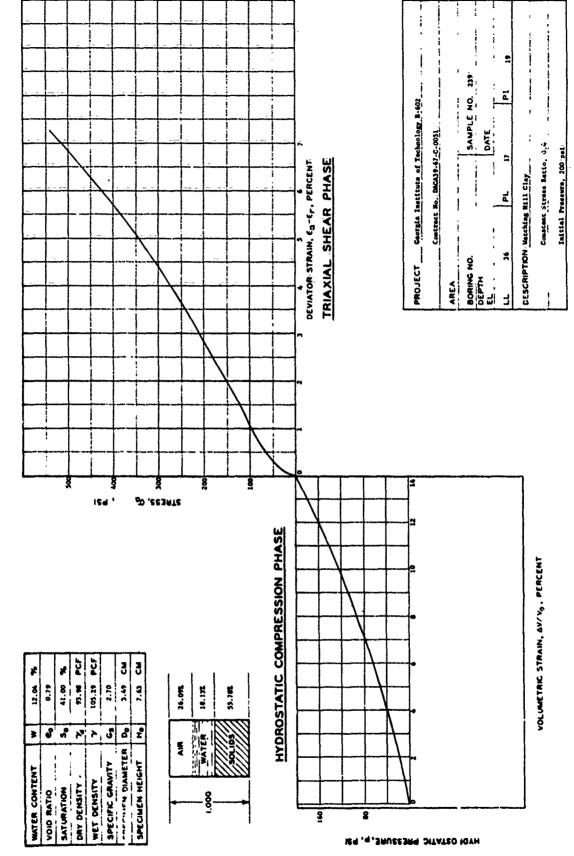




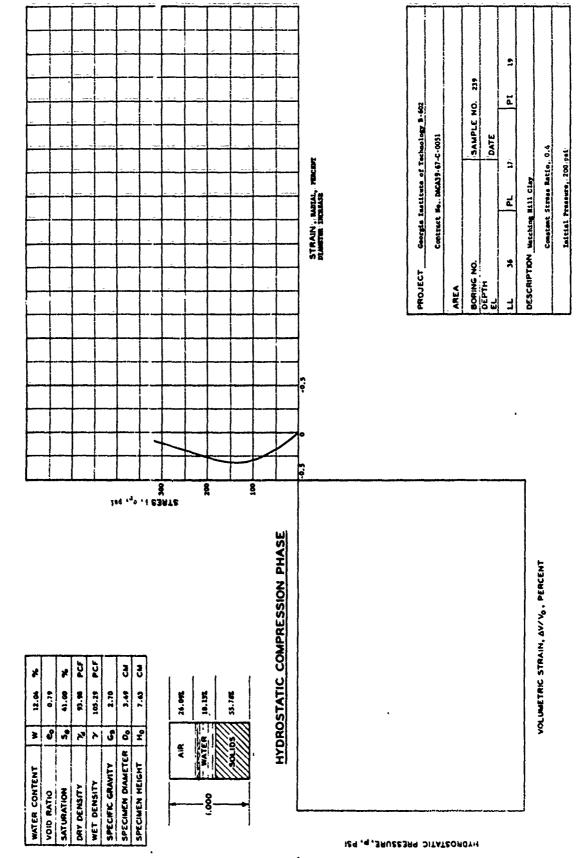
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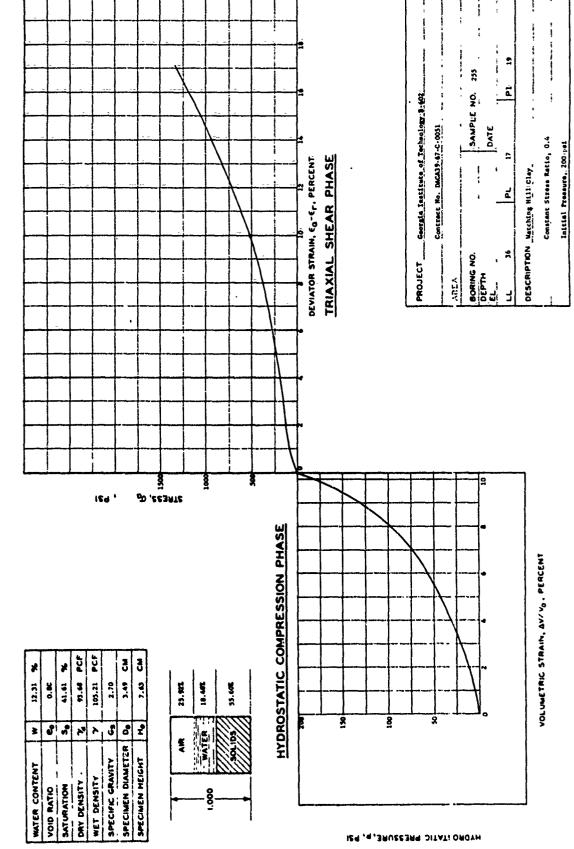
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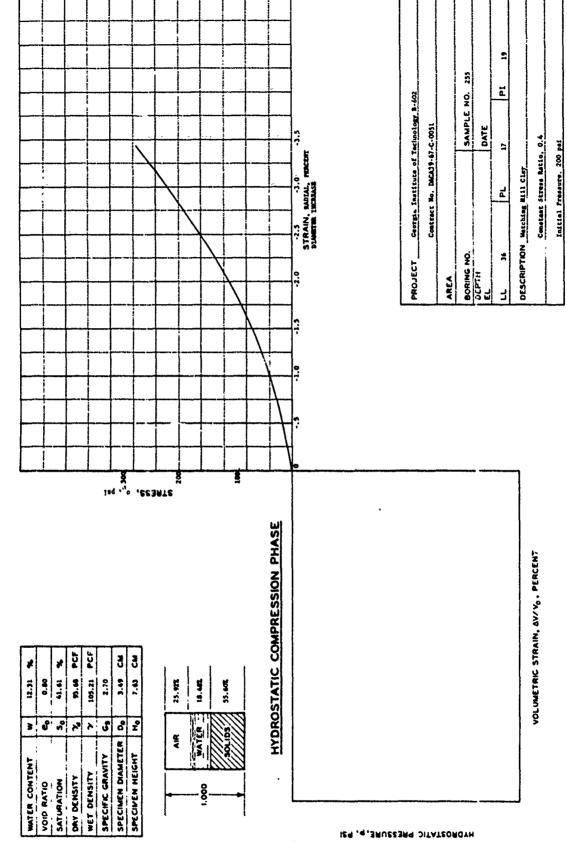


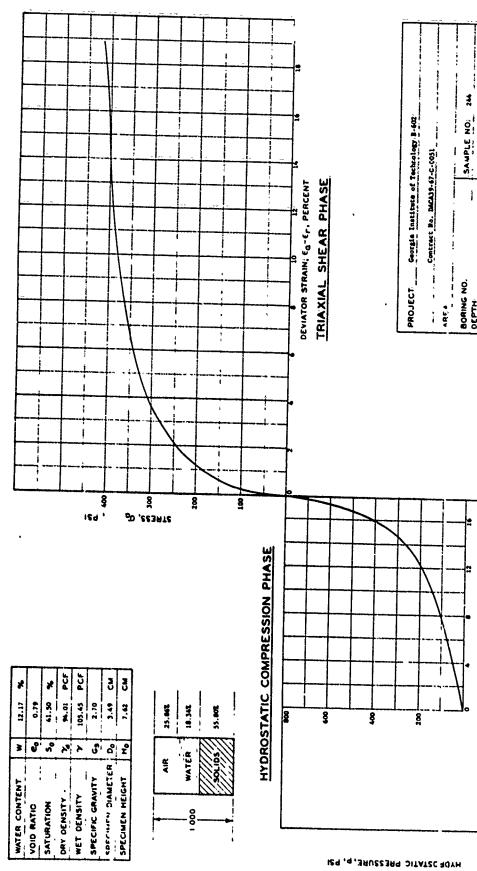


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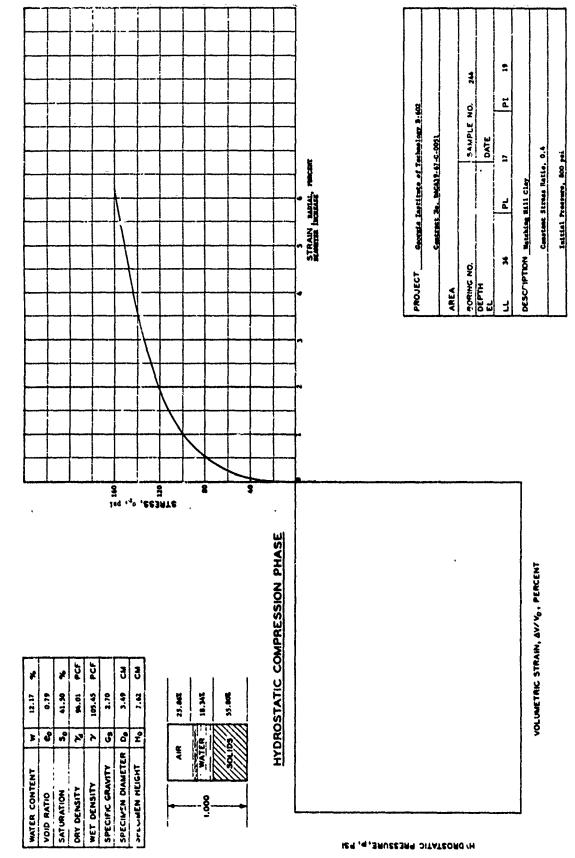


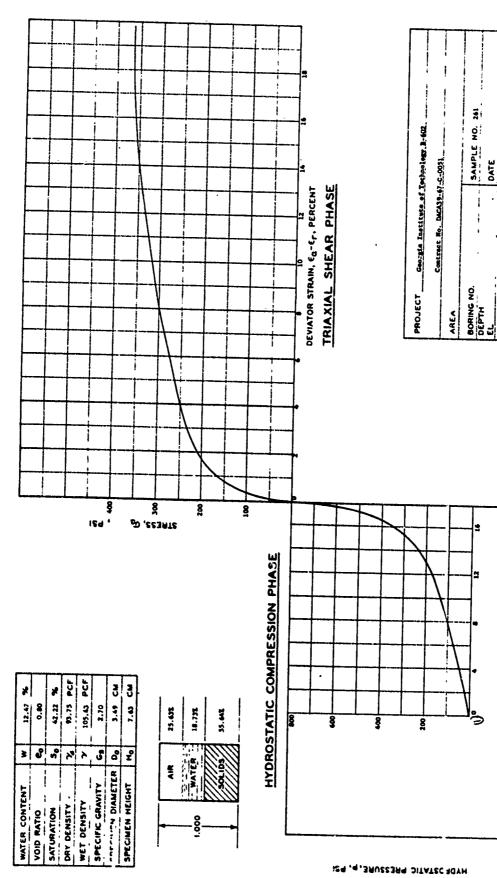
SAMPLE NO. ä DATE Constant Stress Ratio, 0.4 Initial: Pressure: 800'pei DE SCRIPTION Metching Mill Clay 4 * BORING NO. DEPTH

VOLUWETRIC STRAIN, AV/ Vo. PERCENT

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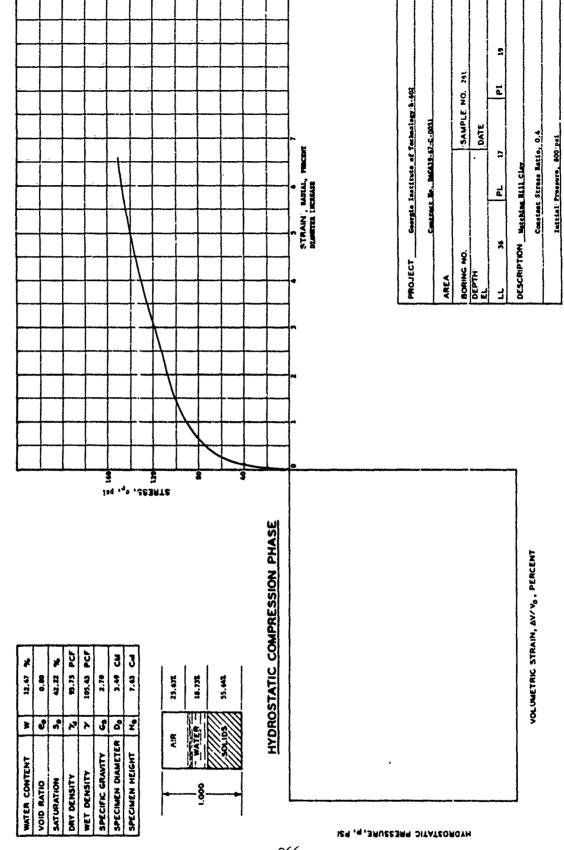
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Constant, Stress Batto, Q.4 ... Initial Preseurs, 800 psi

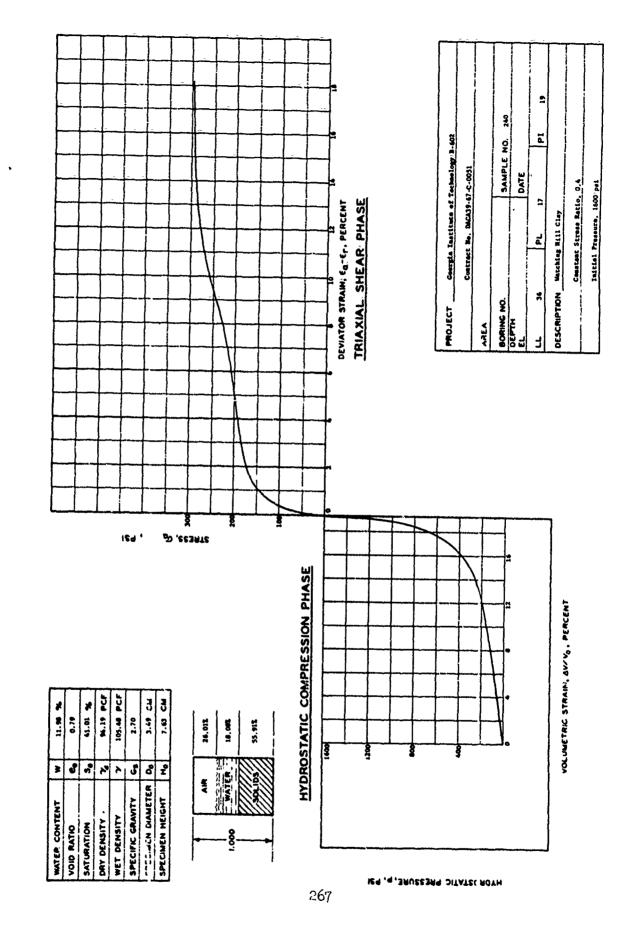
DESCRIPTION Matching MIII Clay

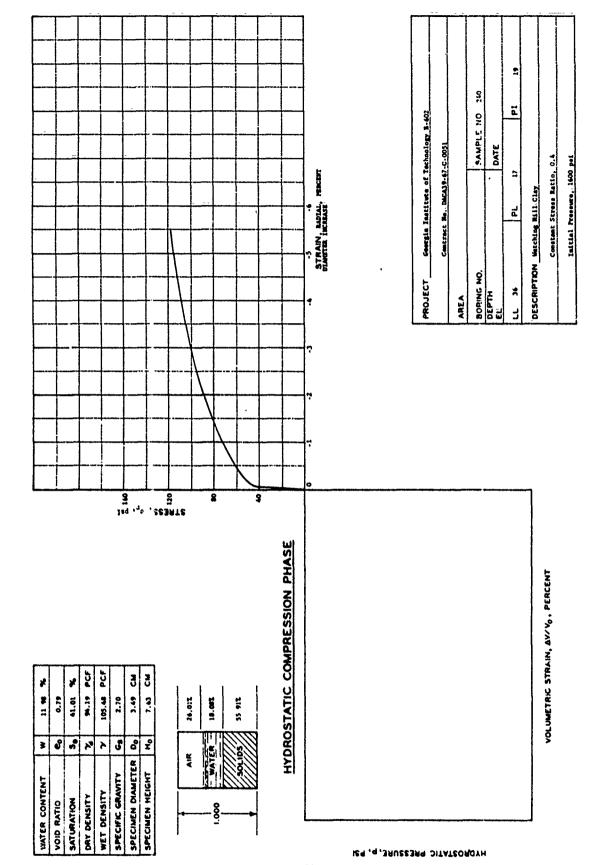
VOLUMETRIC STRAIN, AV/ VO. PERCENT

DATE

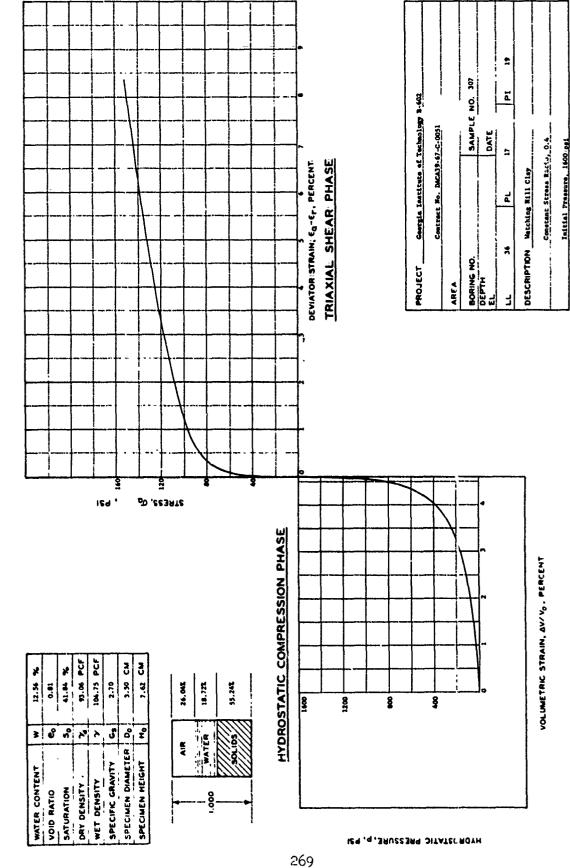


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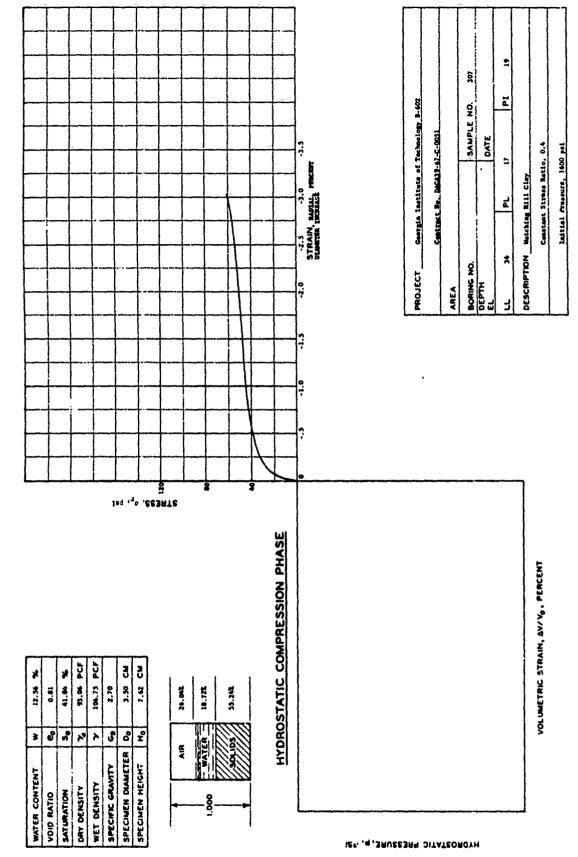


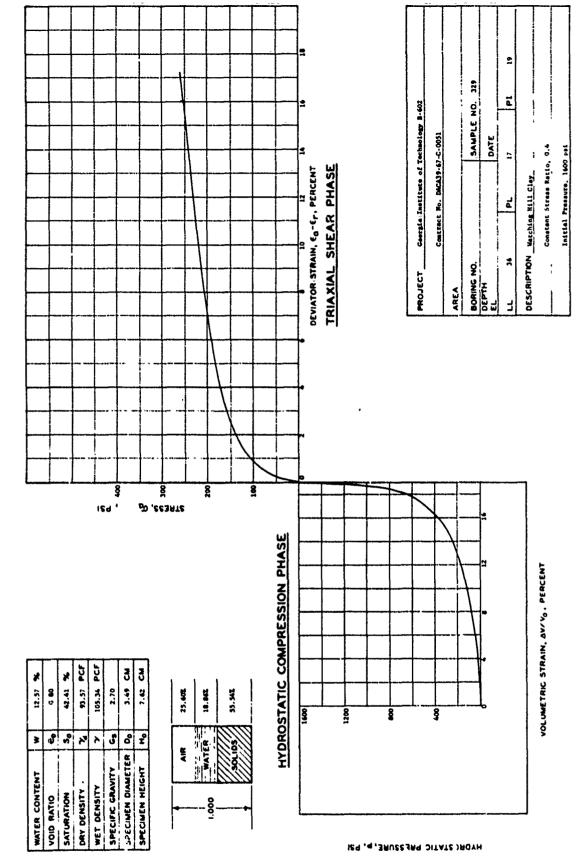


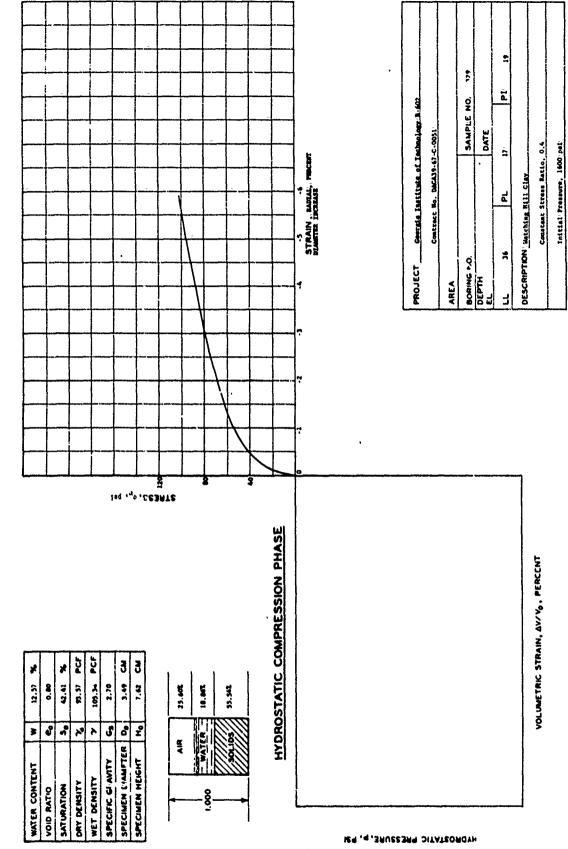
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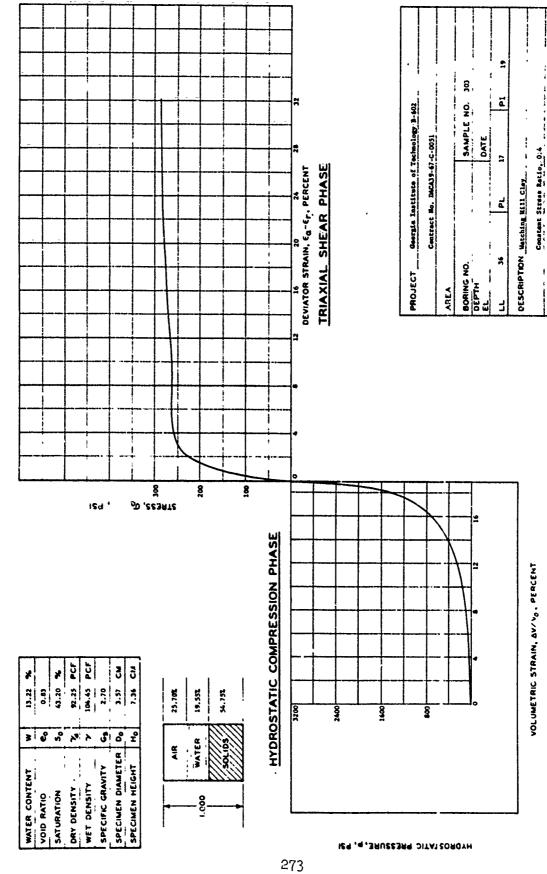


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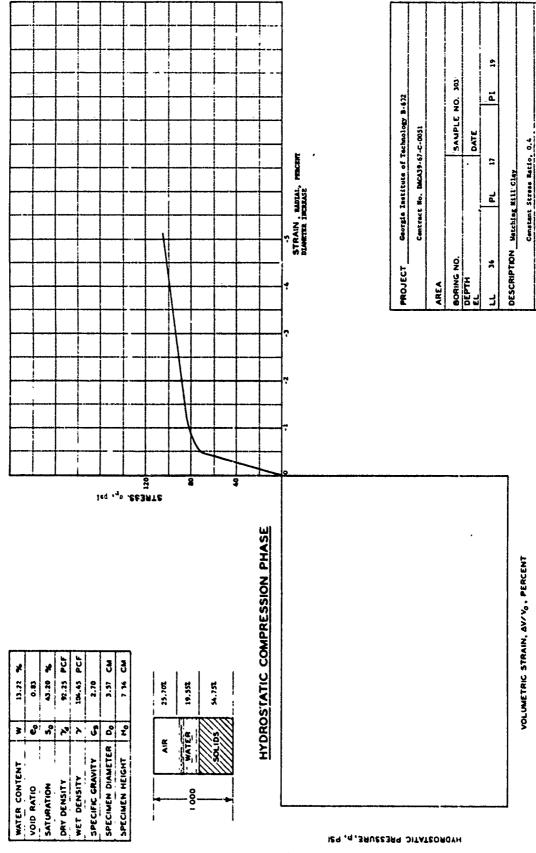




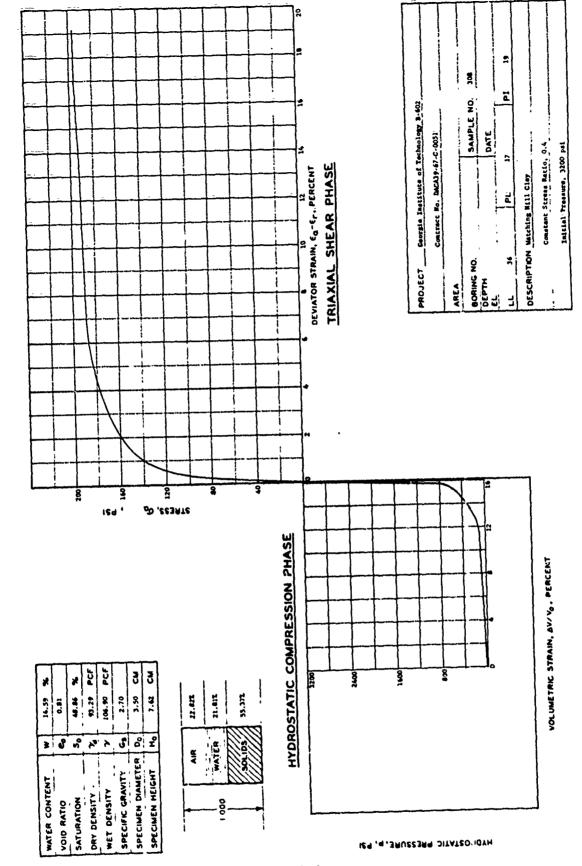


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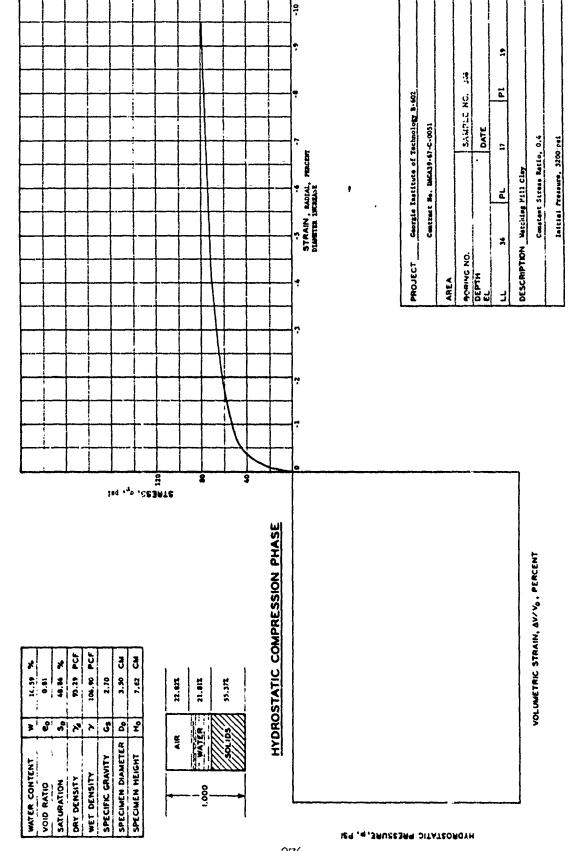
Initial Pressure, 3200 pai

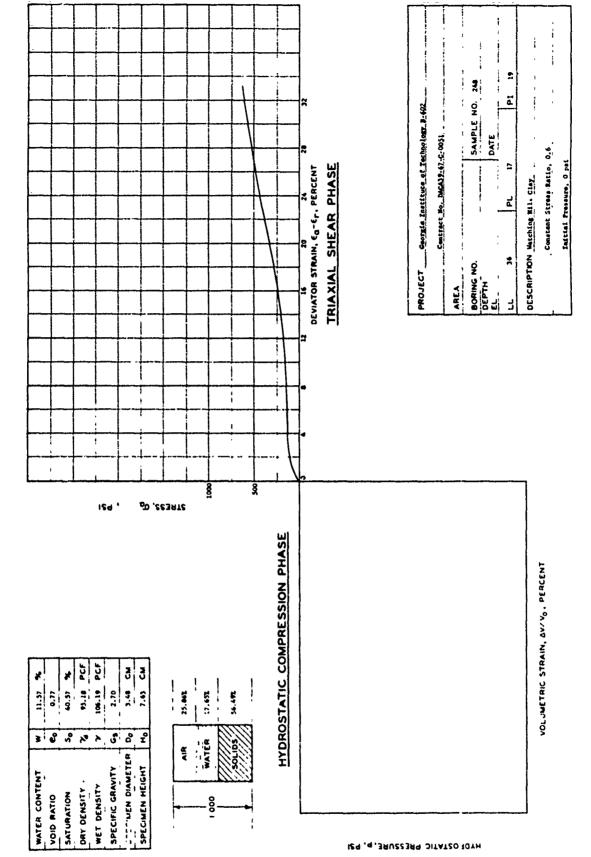


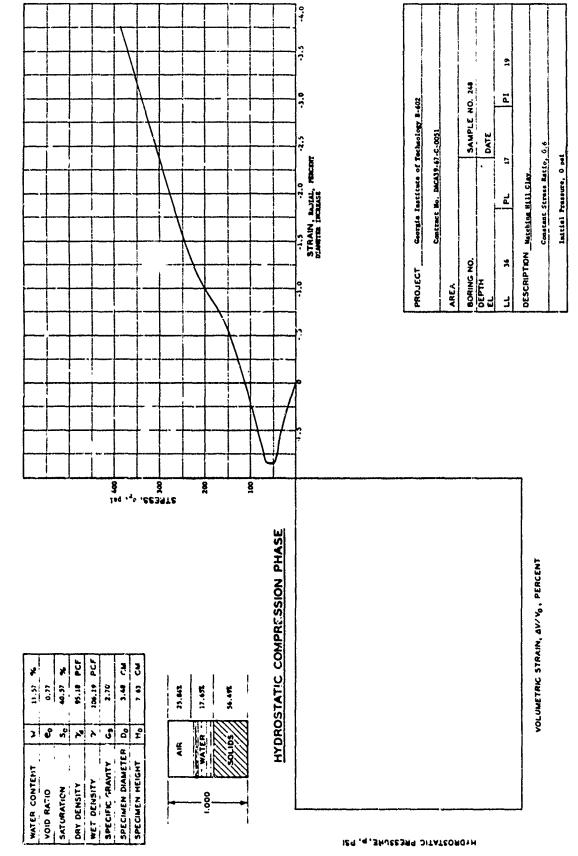
Initial Pressure, 3200 psi

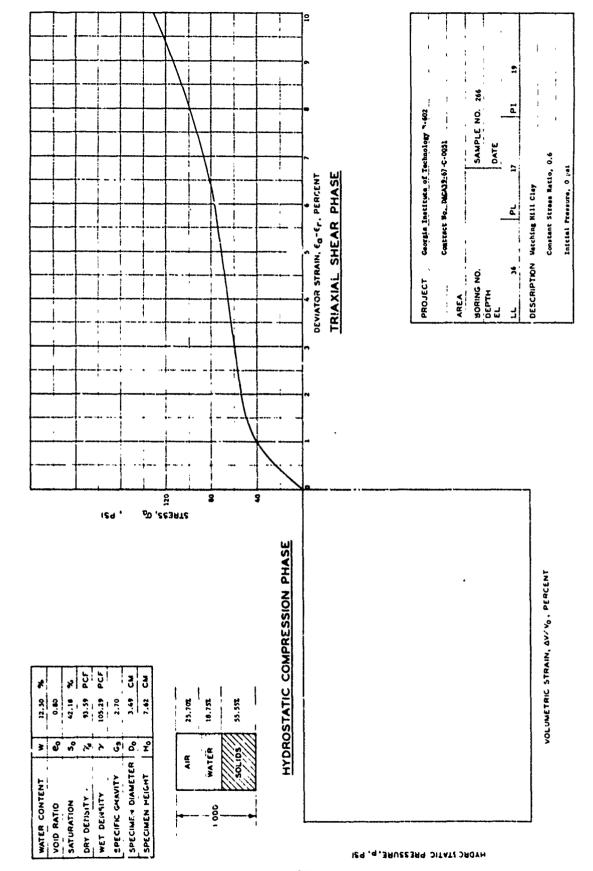


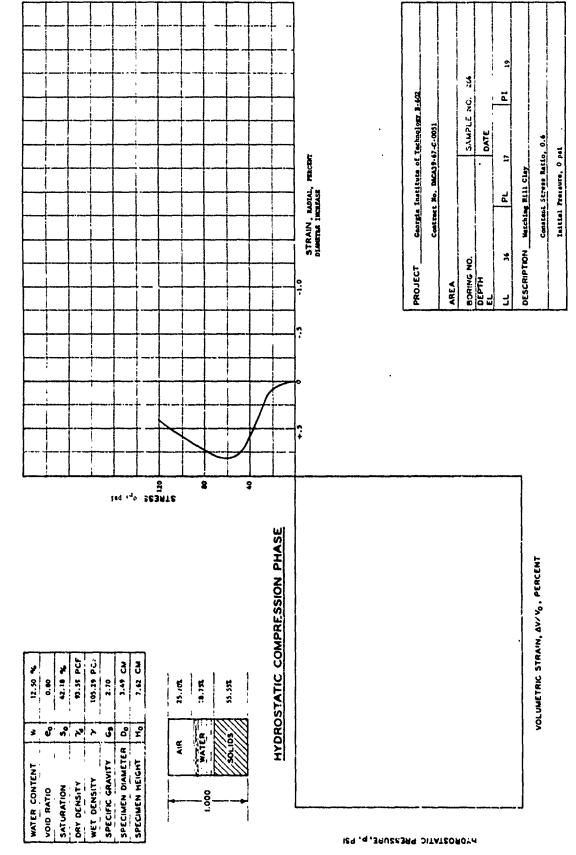
できていていていることのから、これの事をなっていて、ことものになっているから、これをないとなっているとなっていませんできないというでき

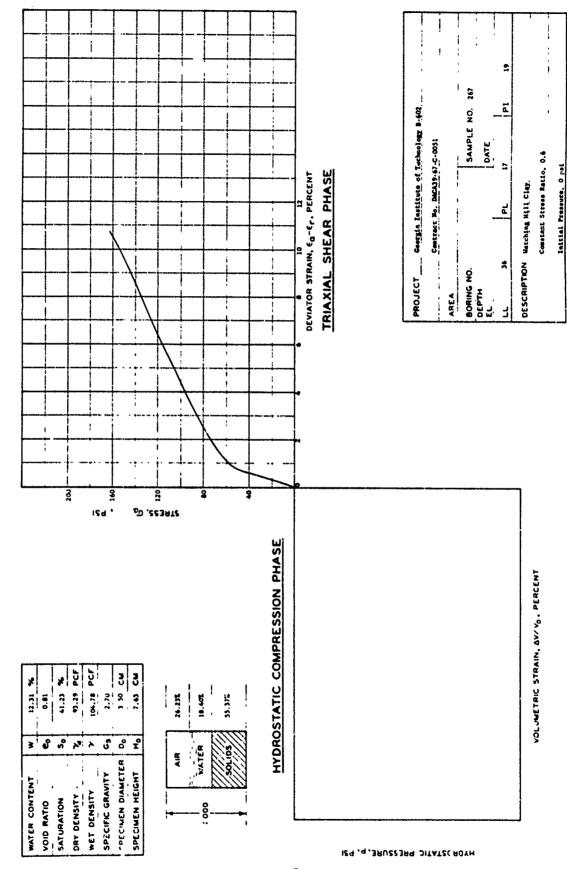




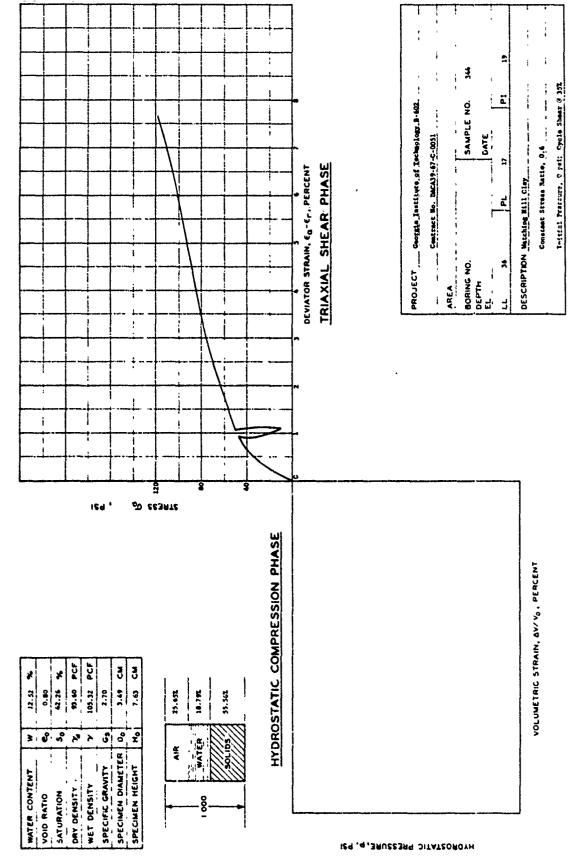


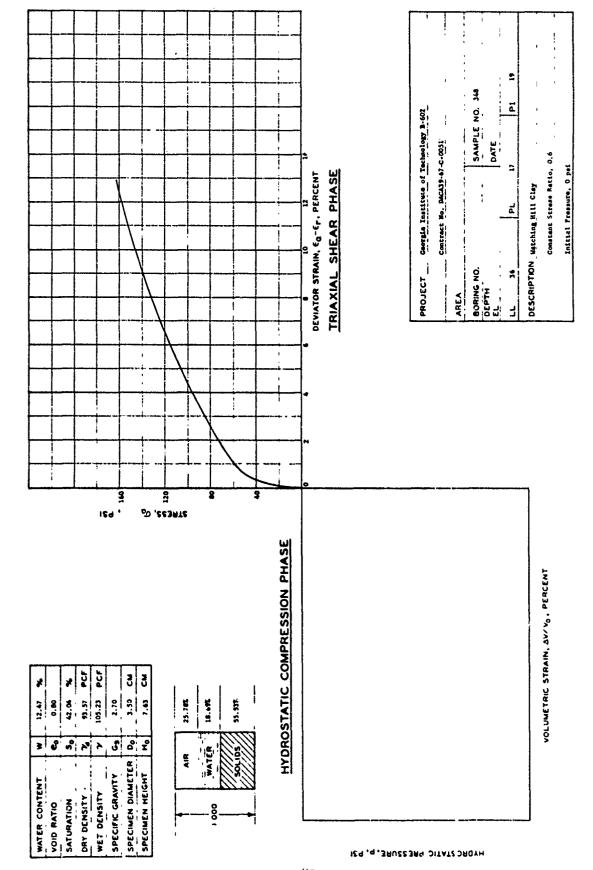


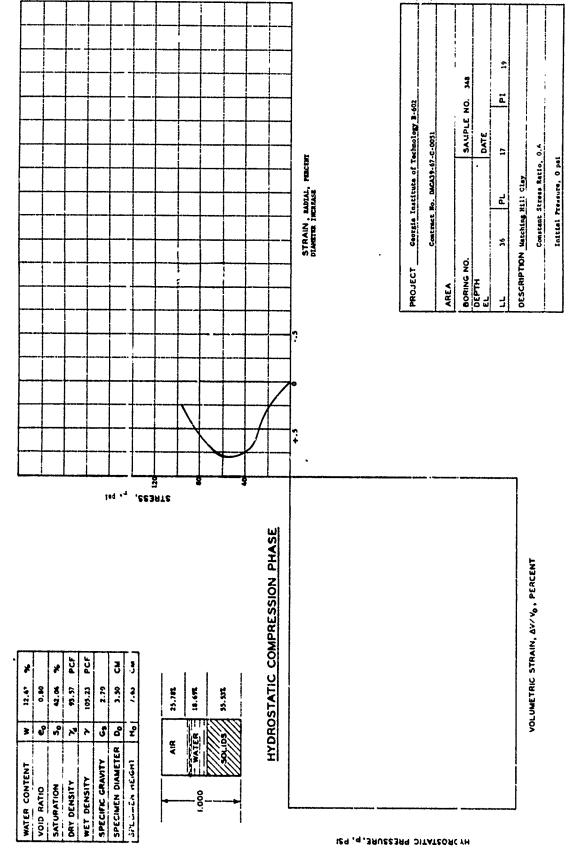




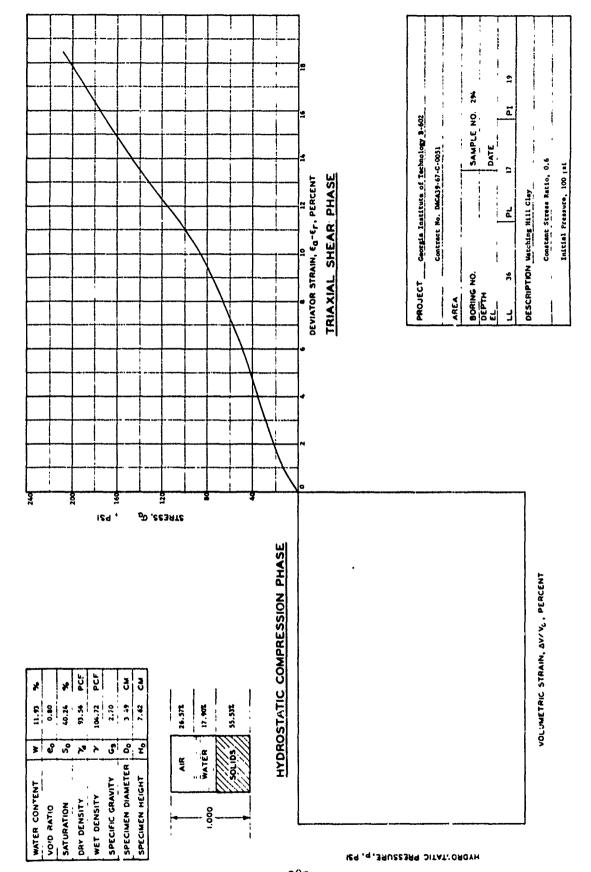
できるから あこなかにも グ・



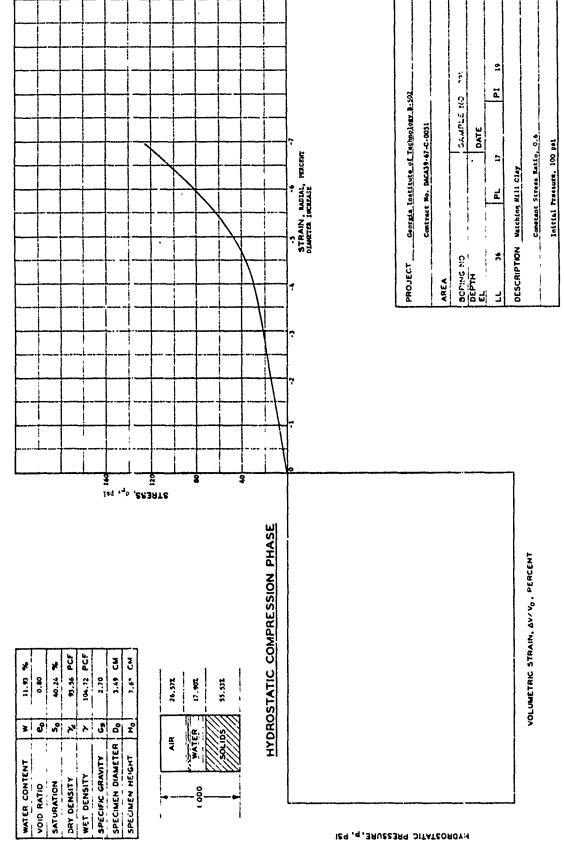


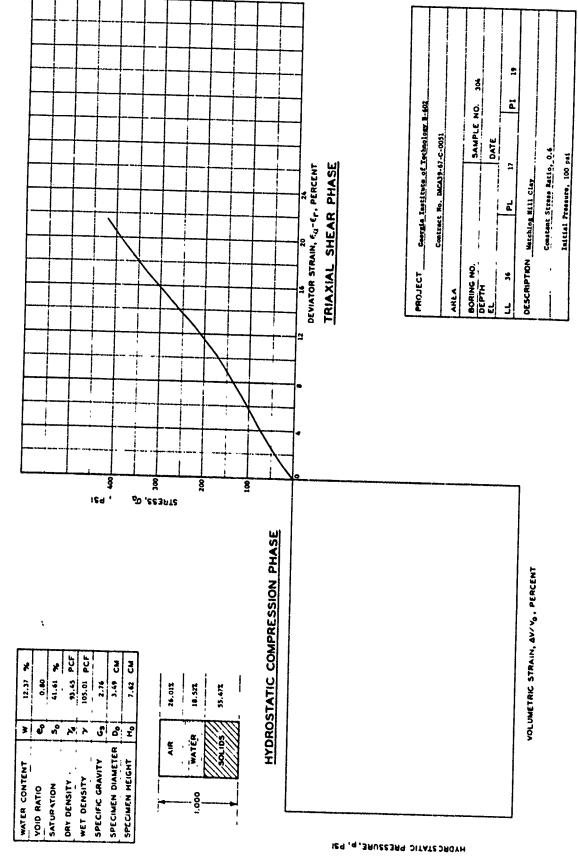


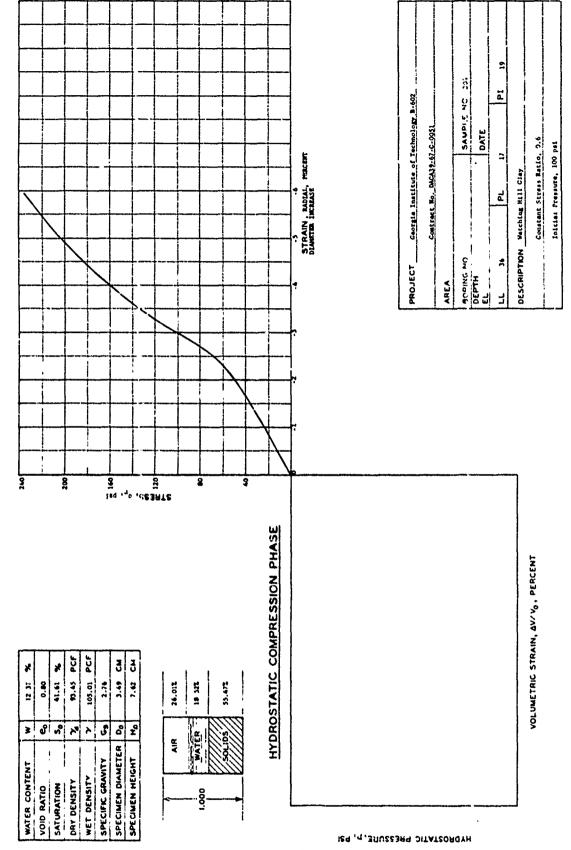
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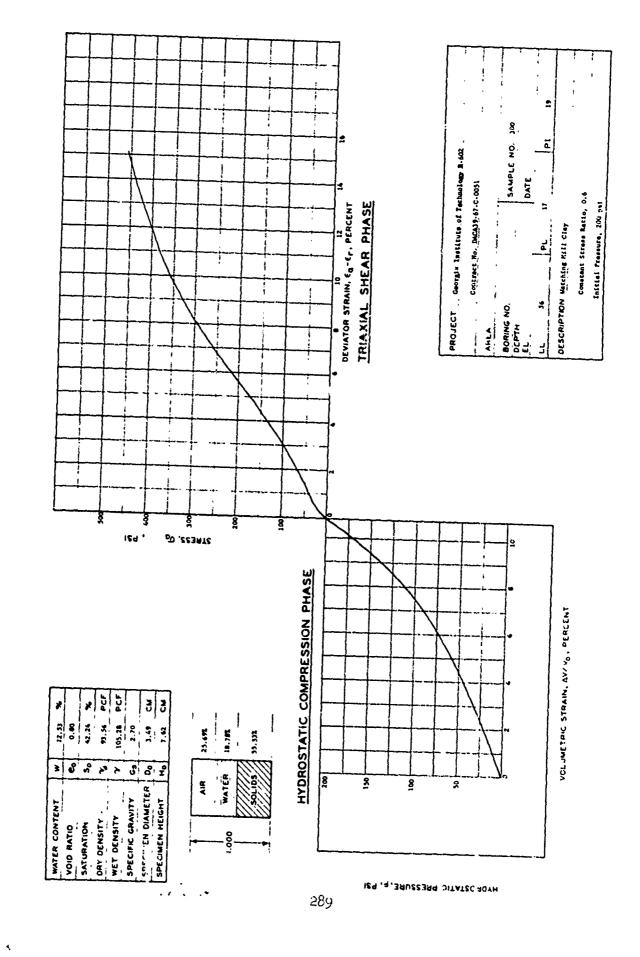


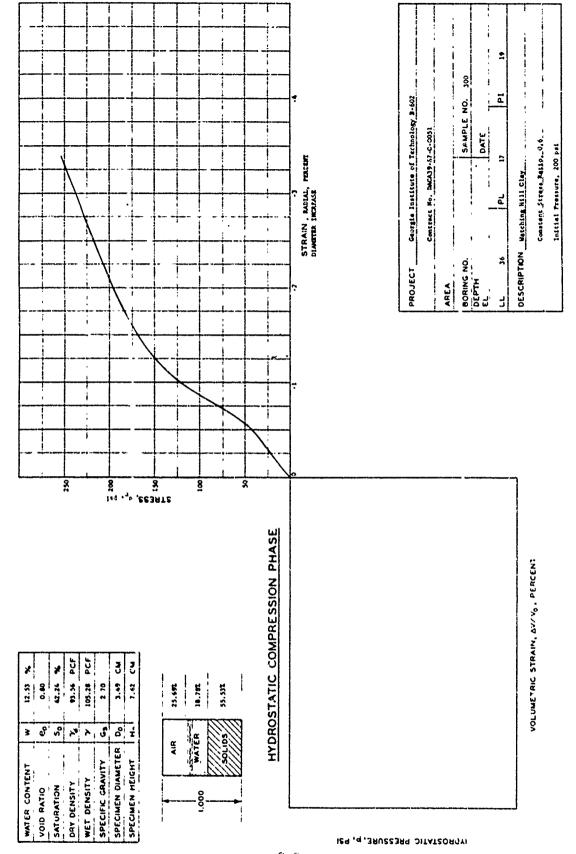
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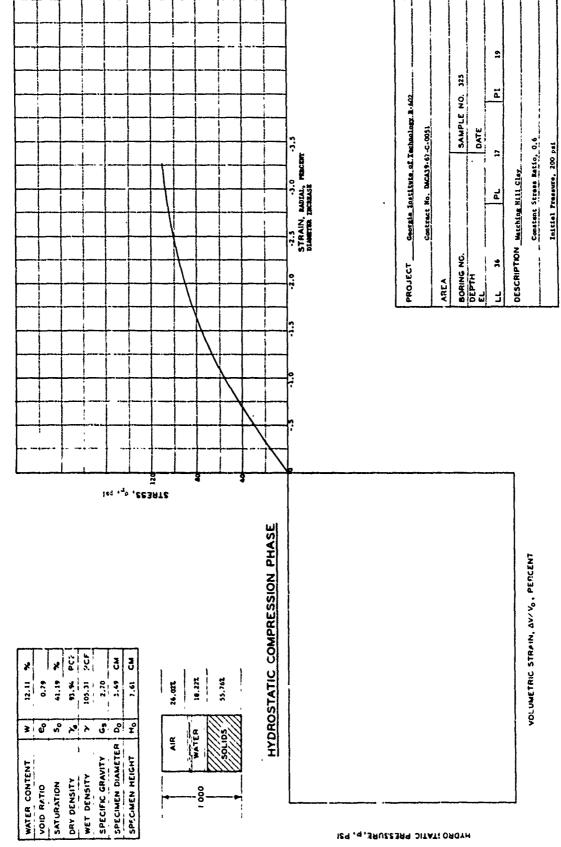


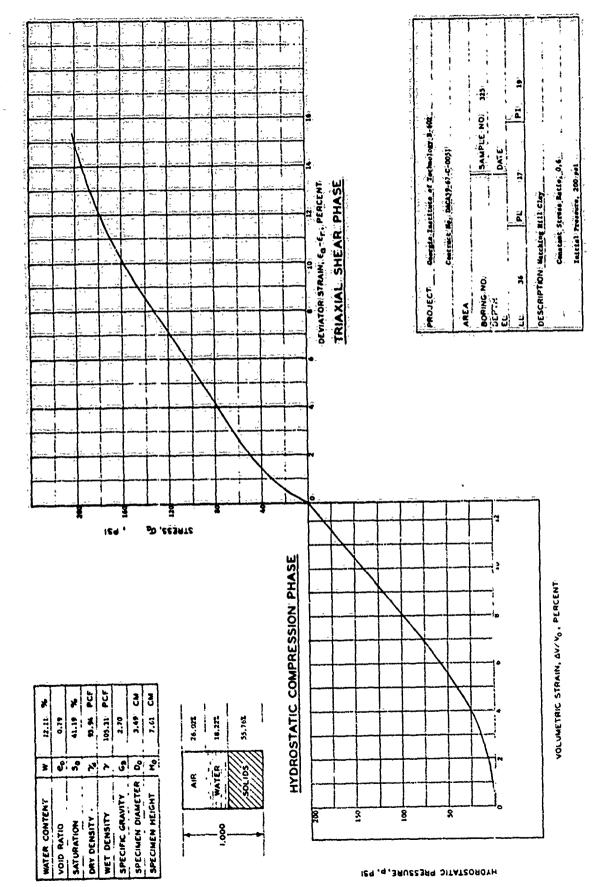


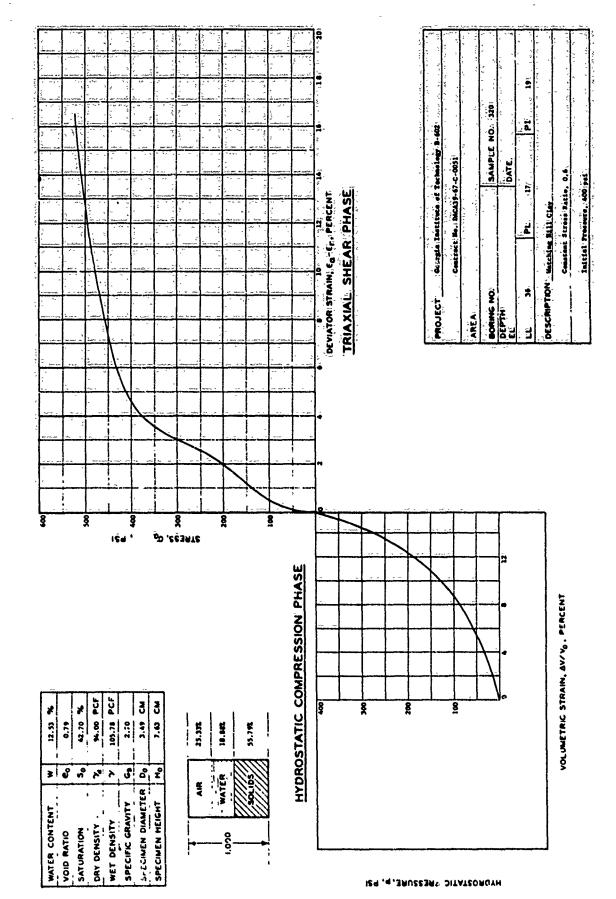


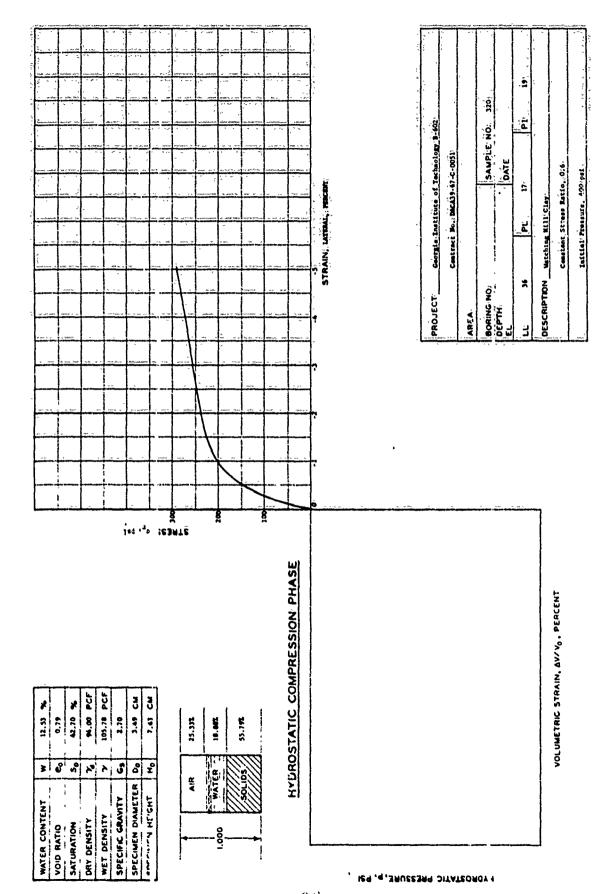


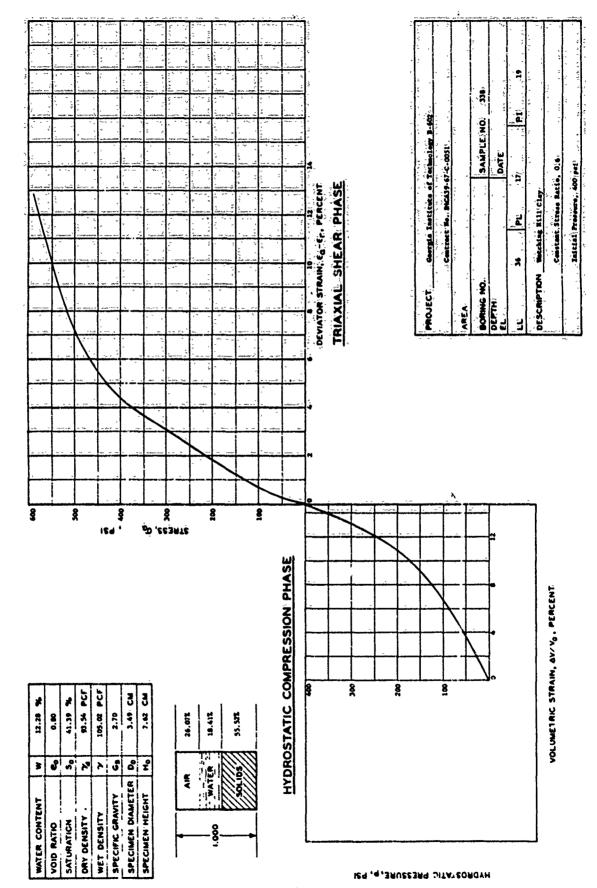


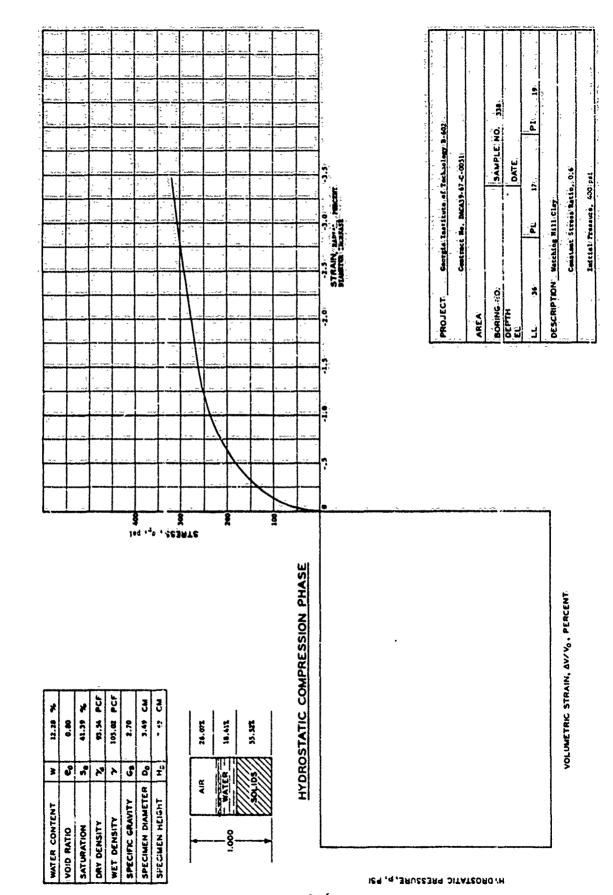


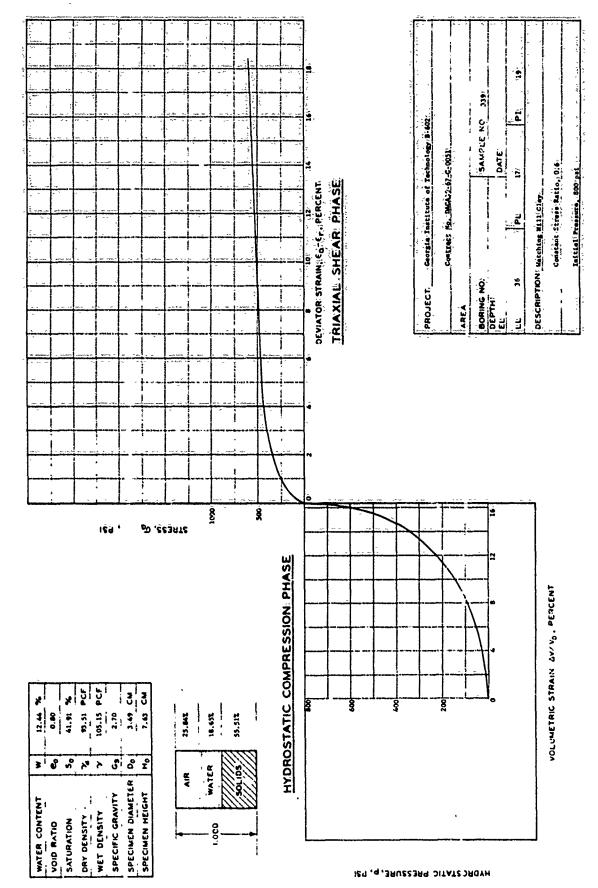


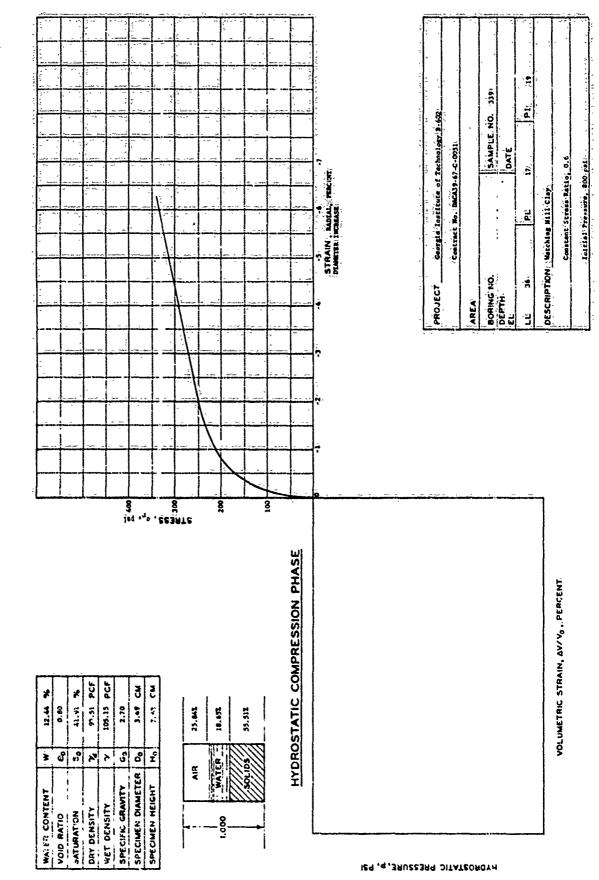


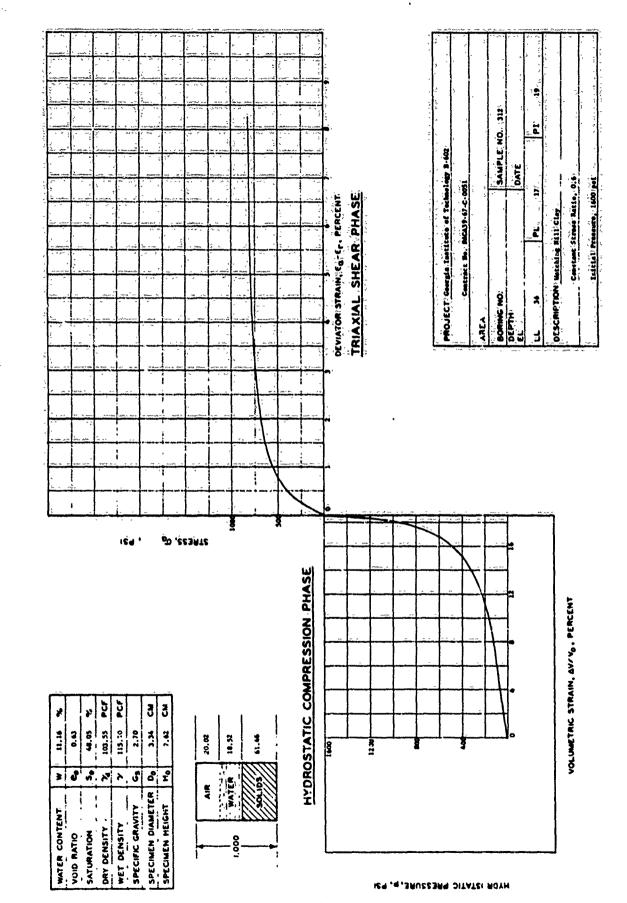




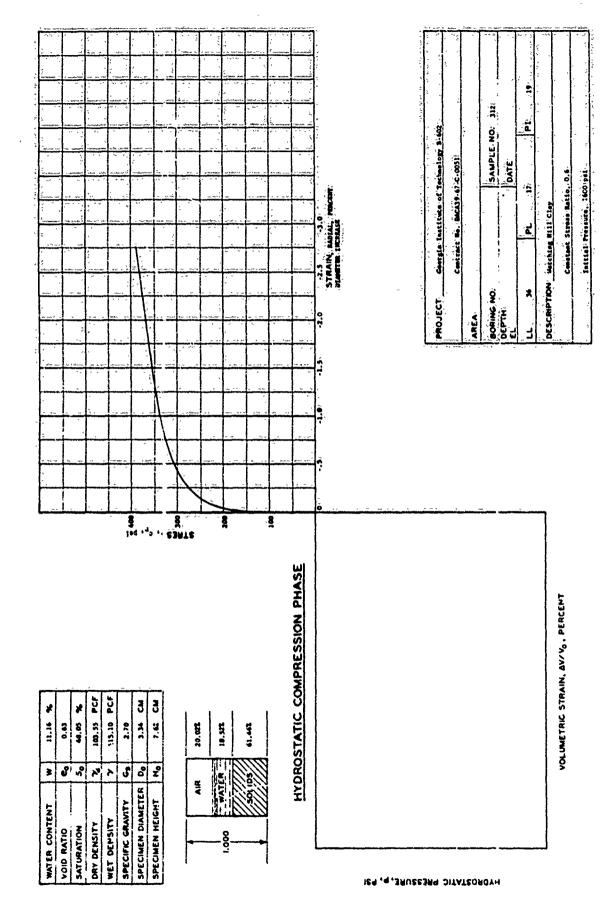


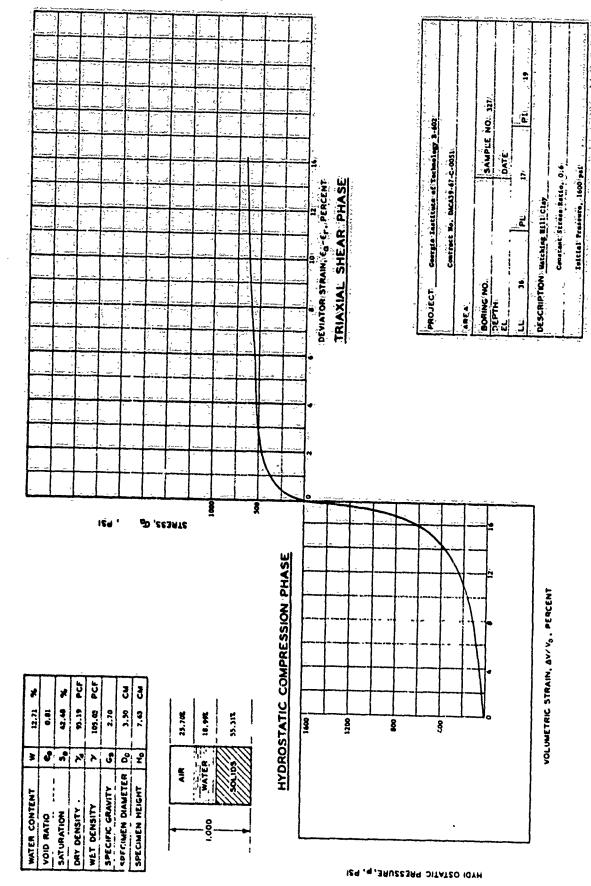




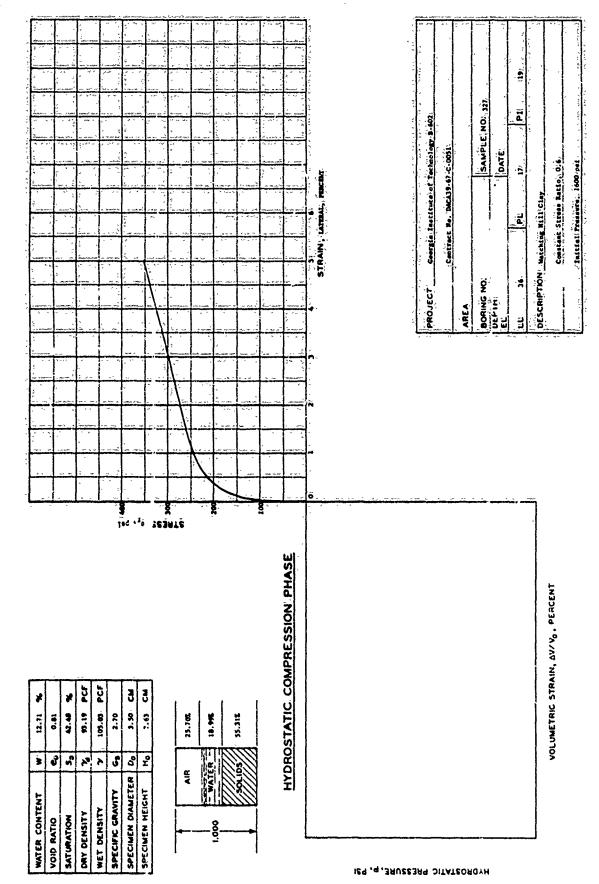


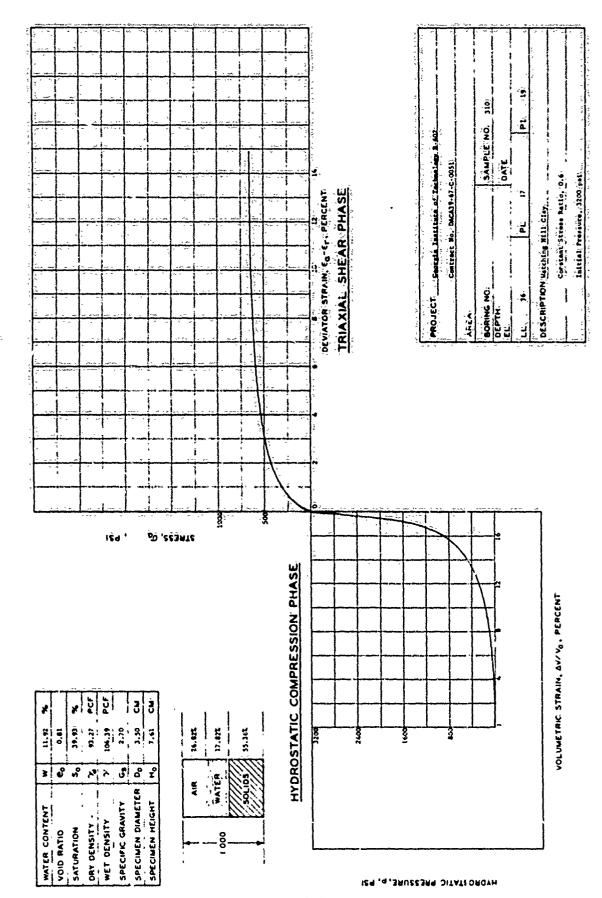
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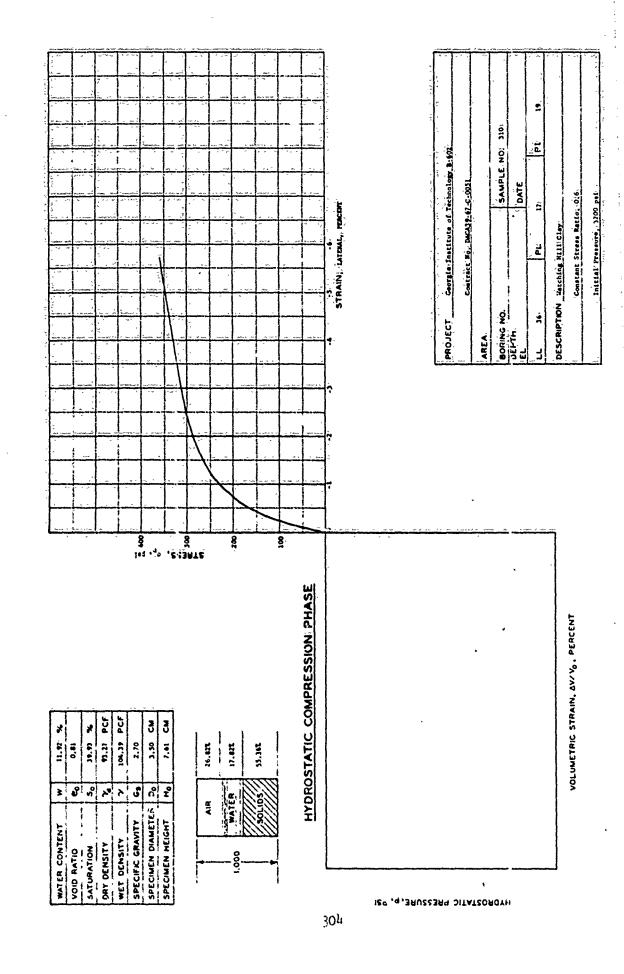


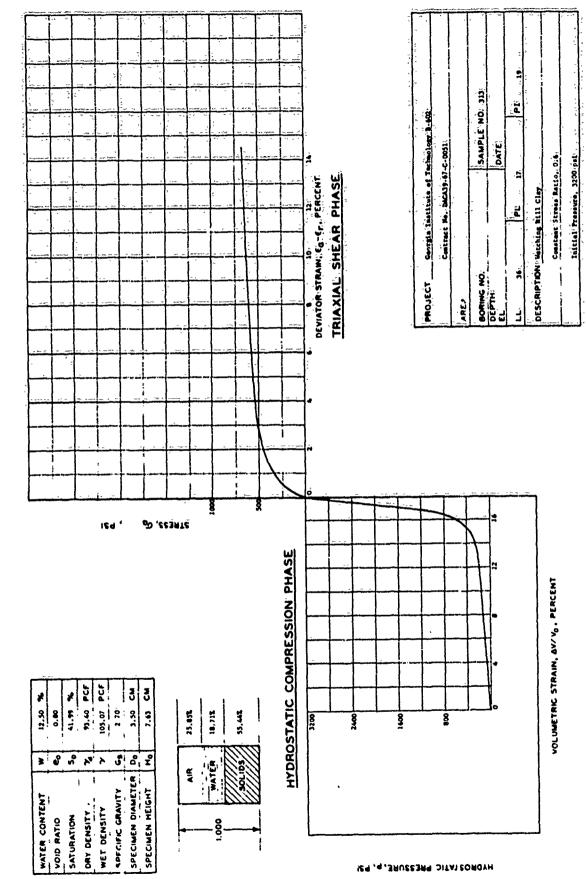
おおかけることがあるないというというという おうかんかんしょう とれるのま

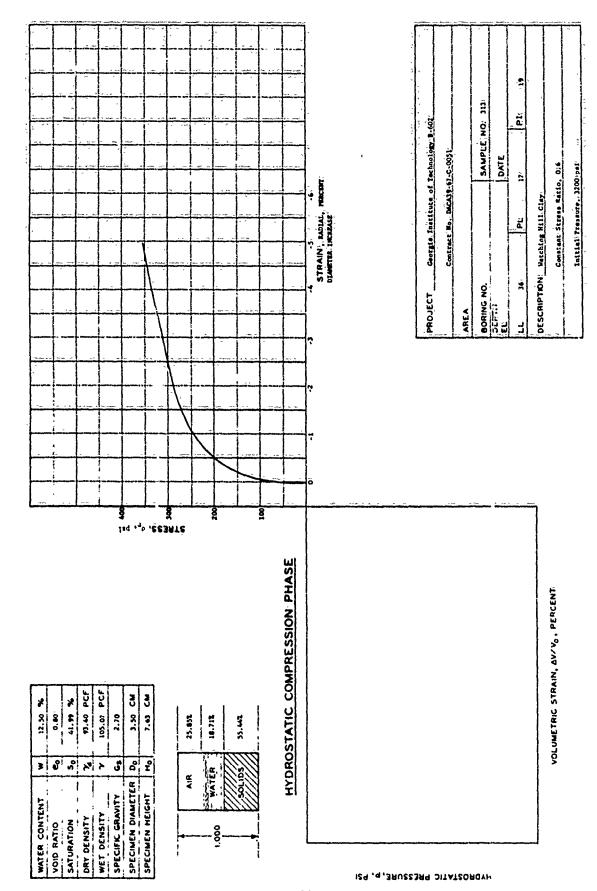


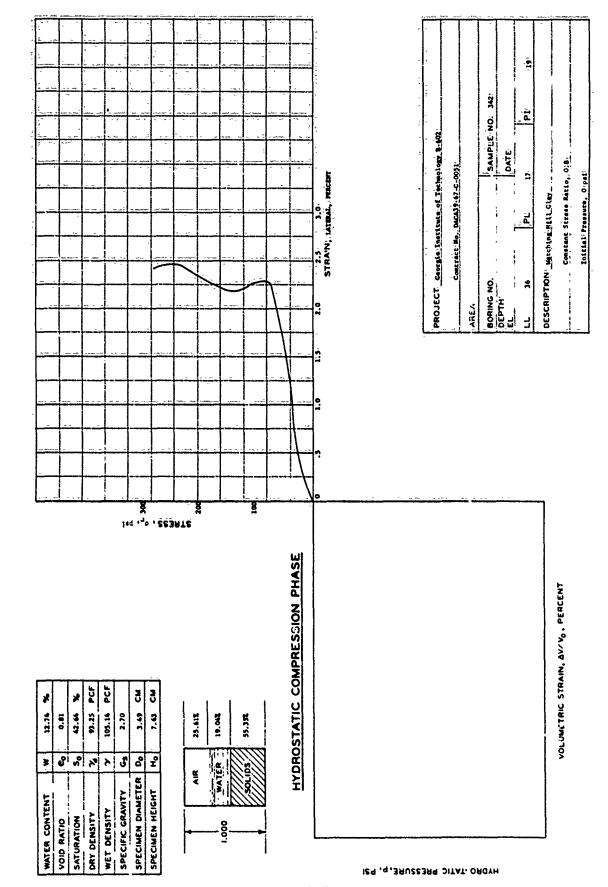


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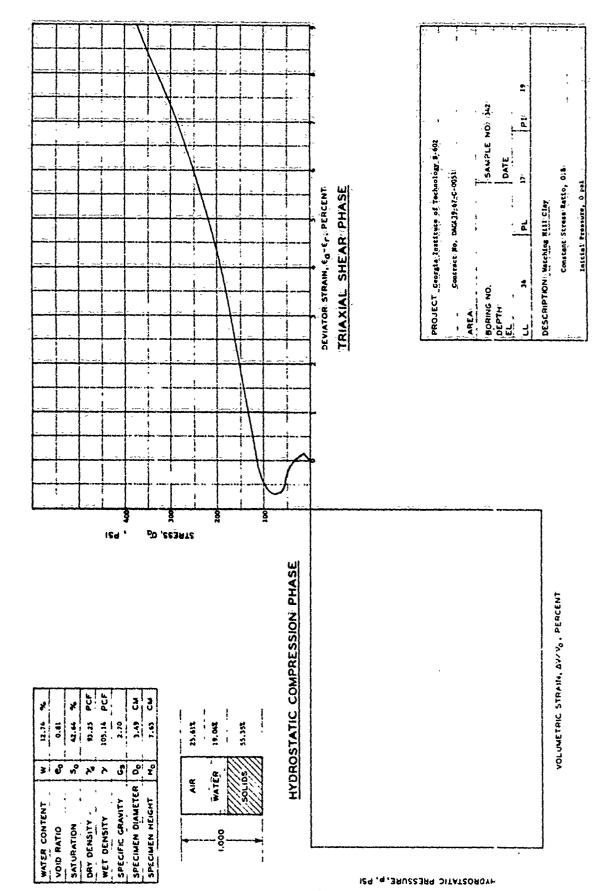


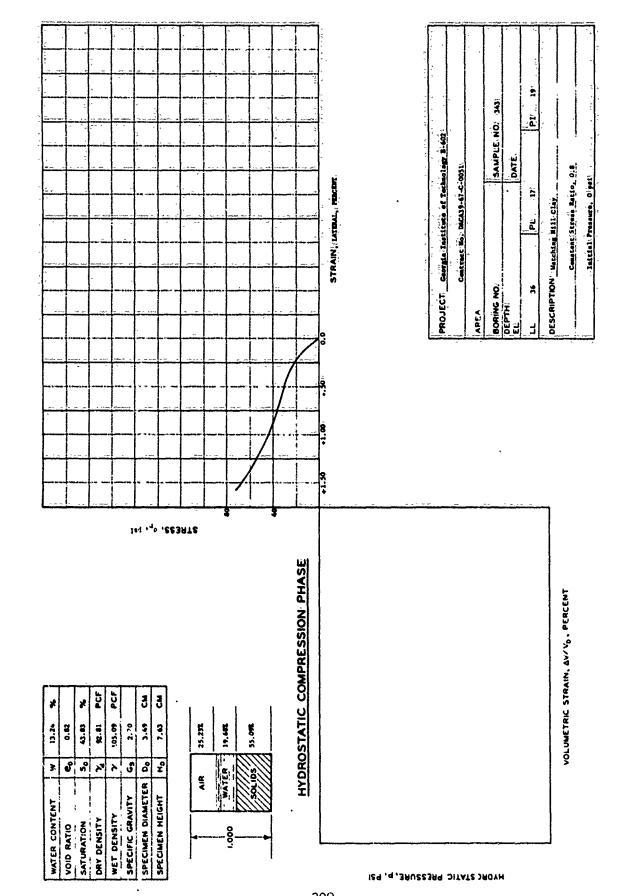


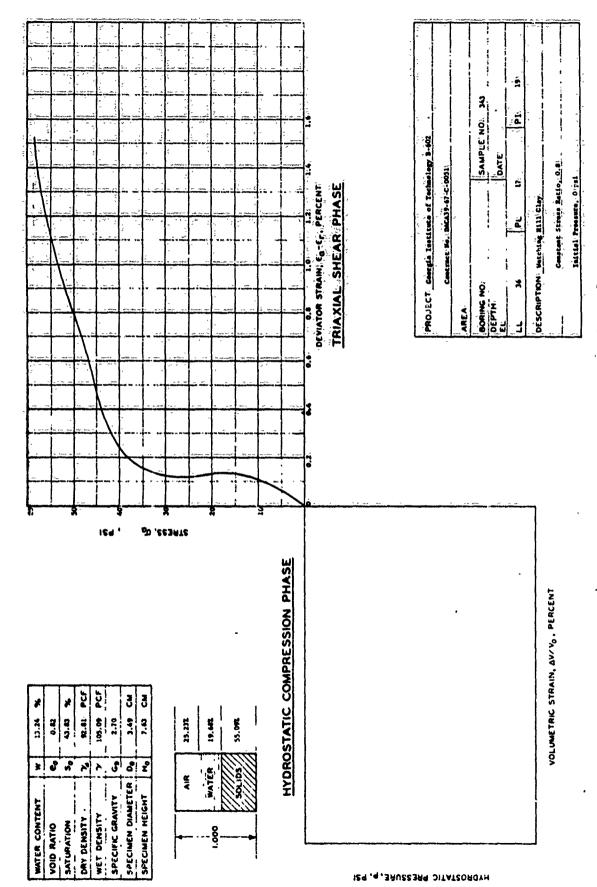


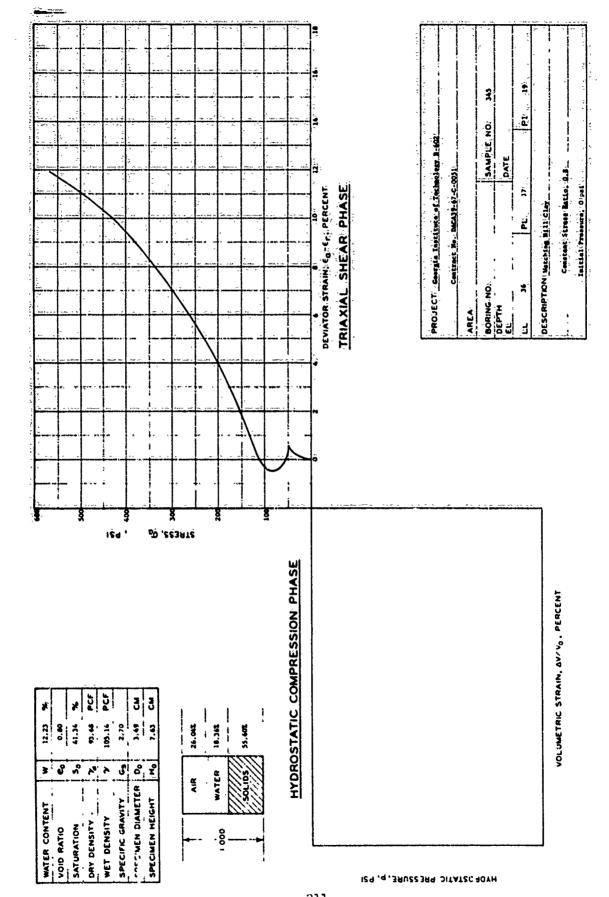


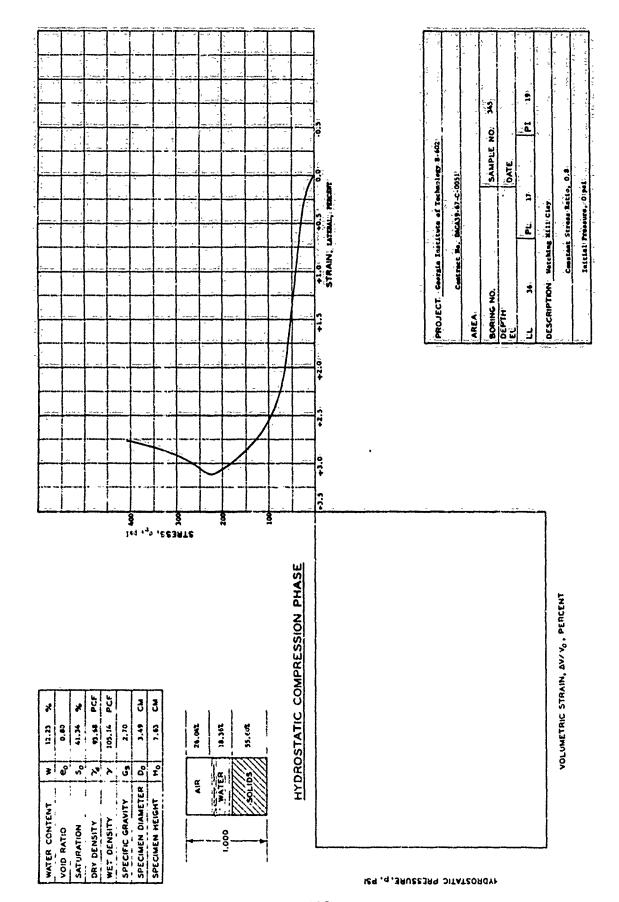
的,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我 第一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个

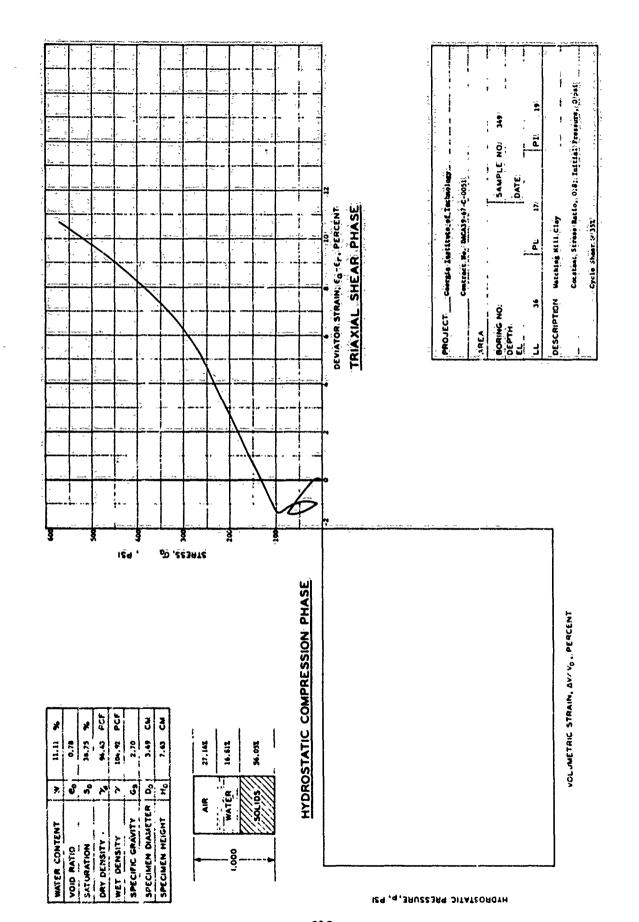




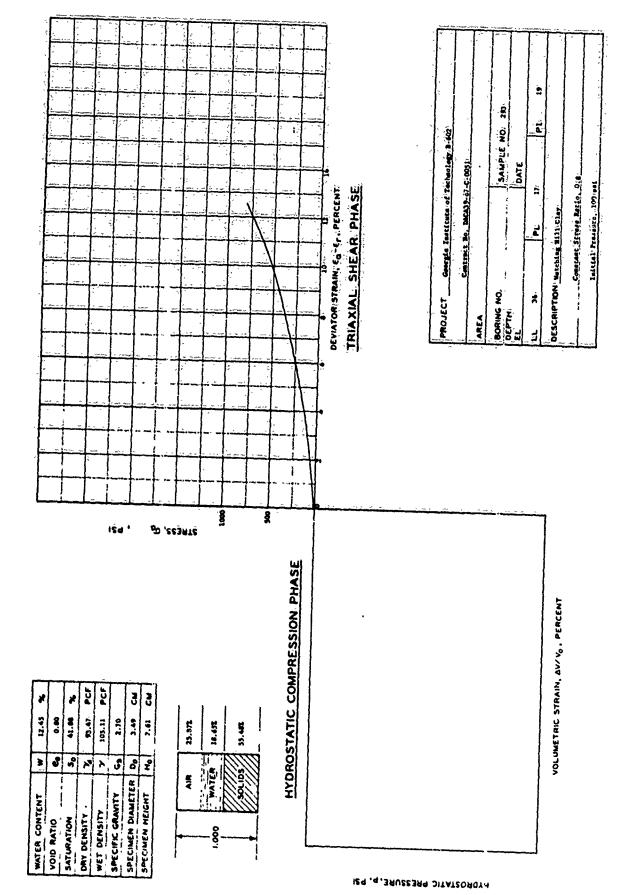


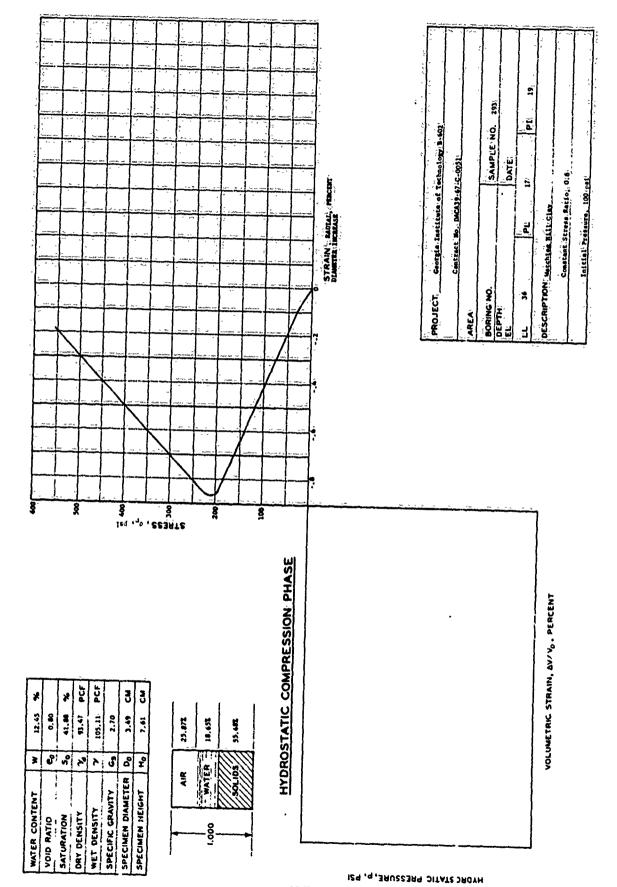




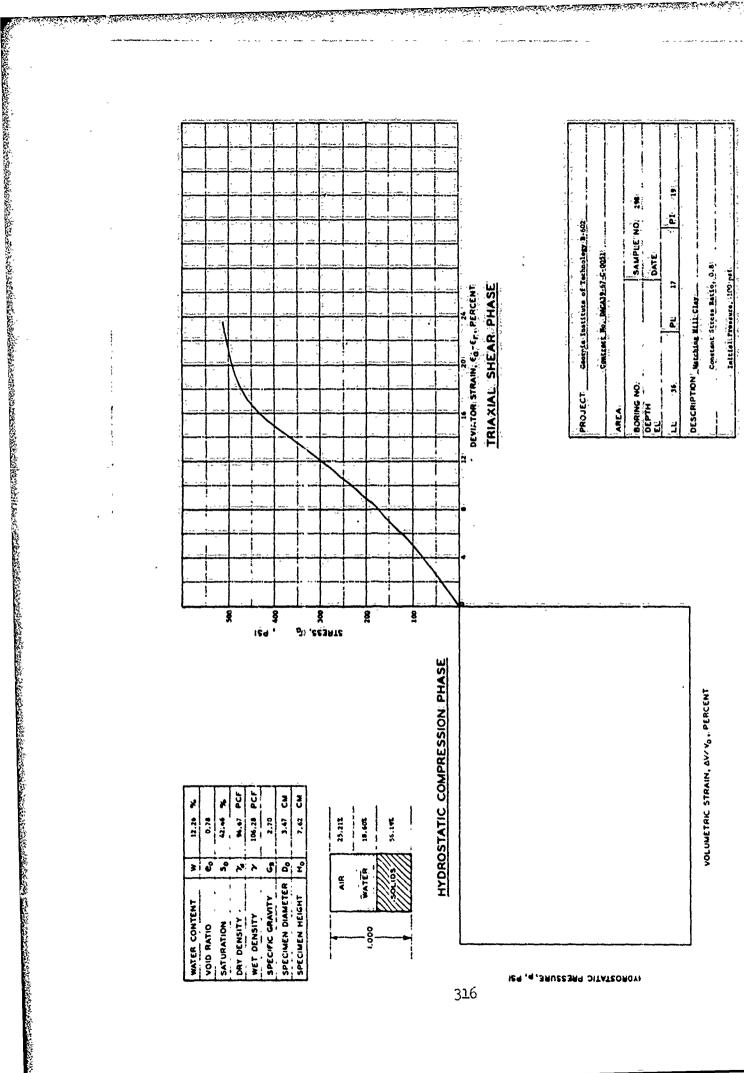


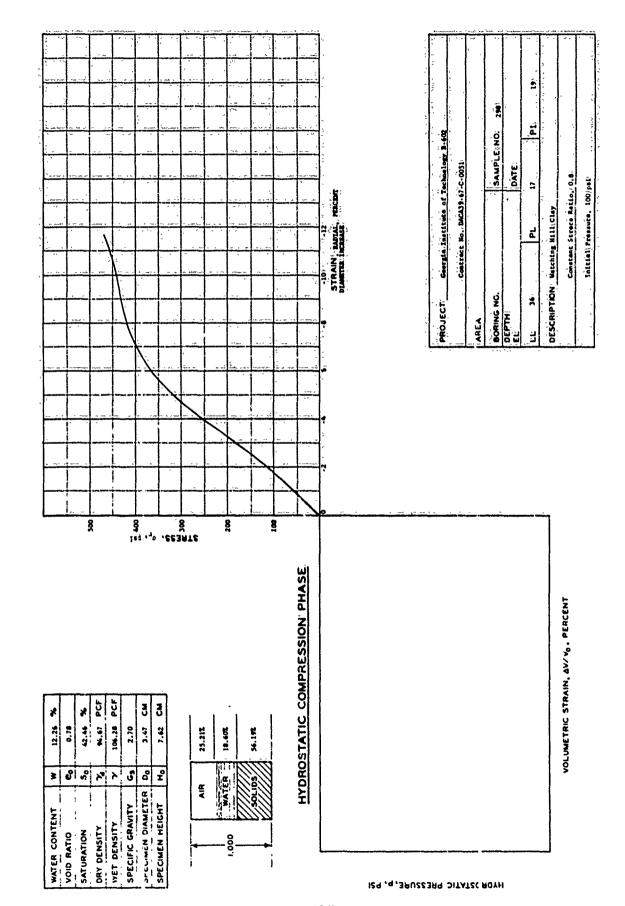
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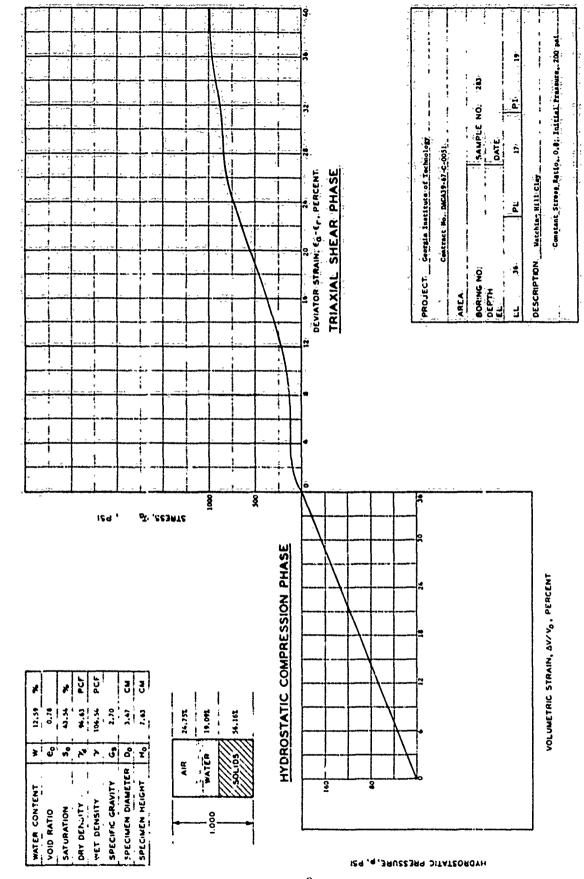
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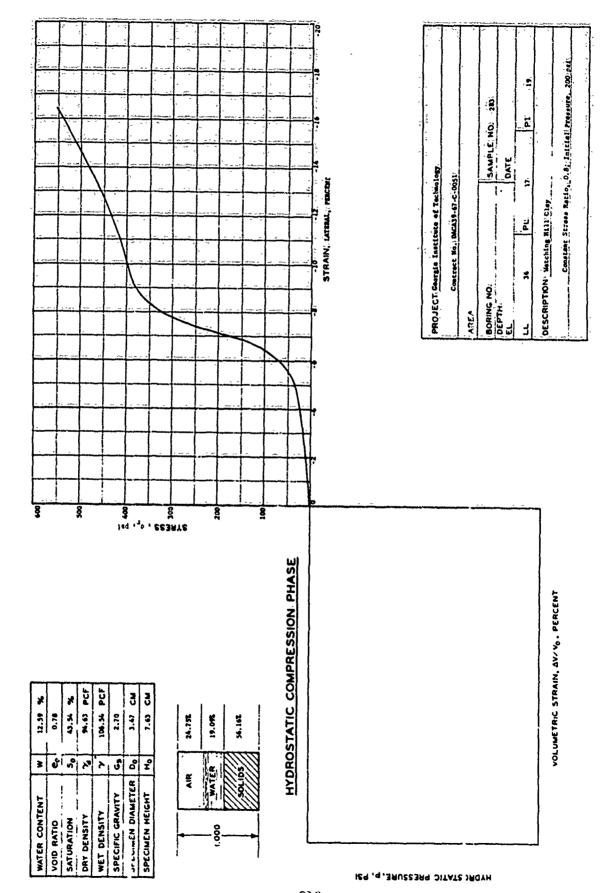


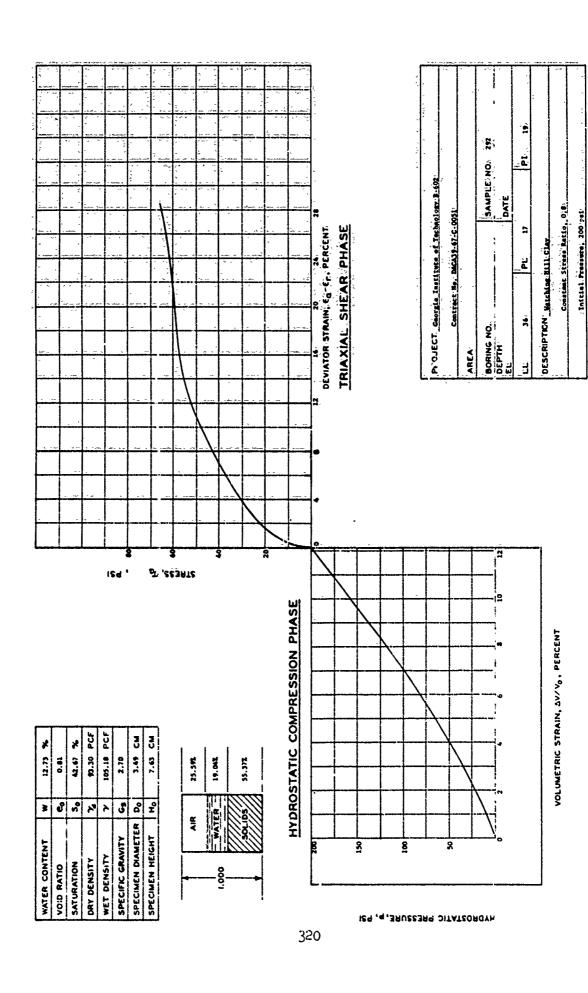


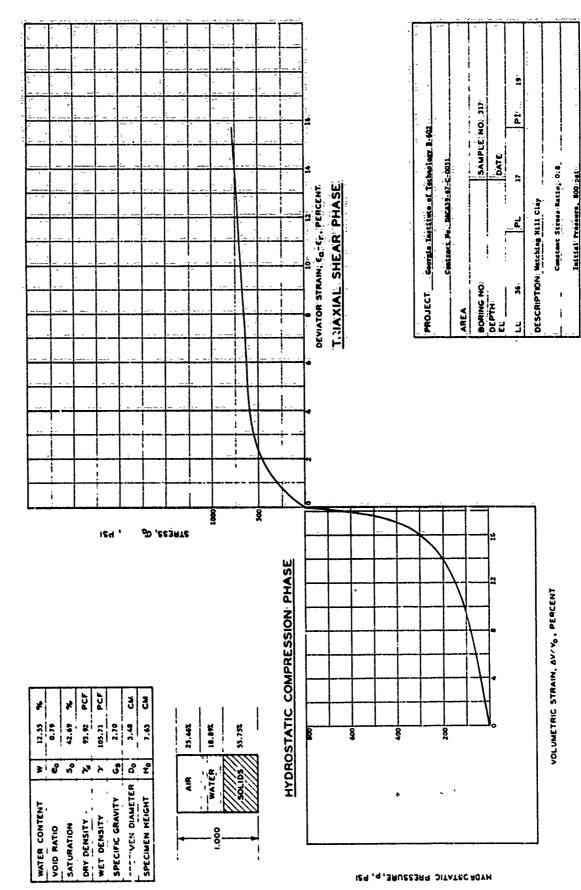
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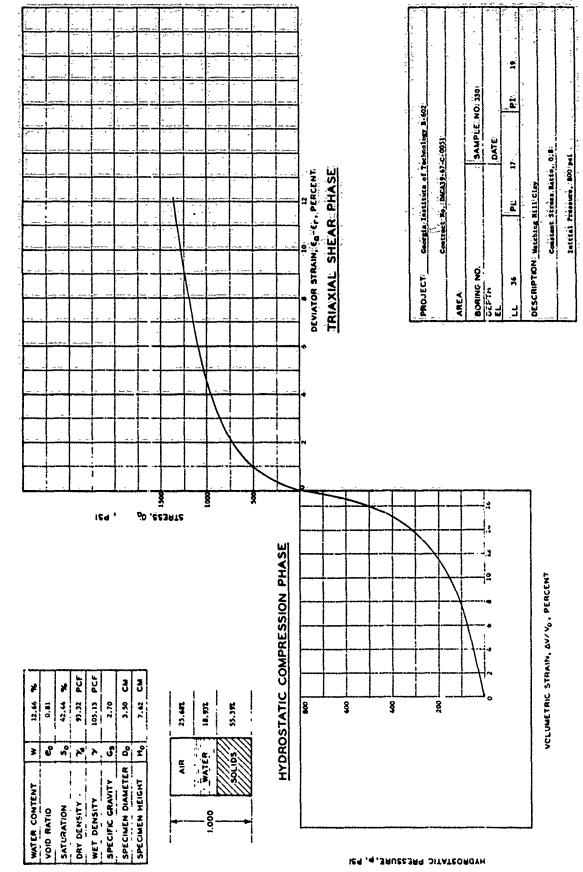
Management of the Committee of the Commi

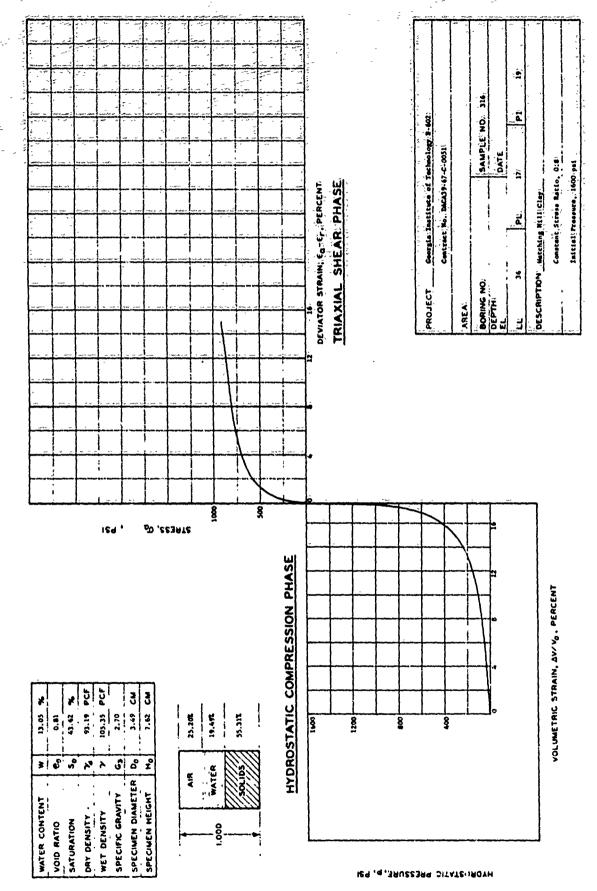


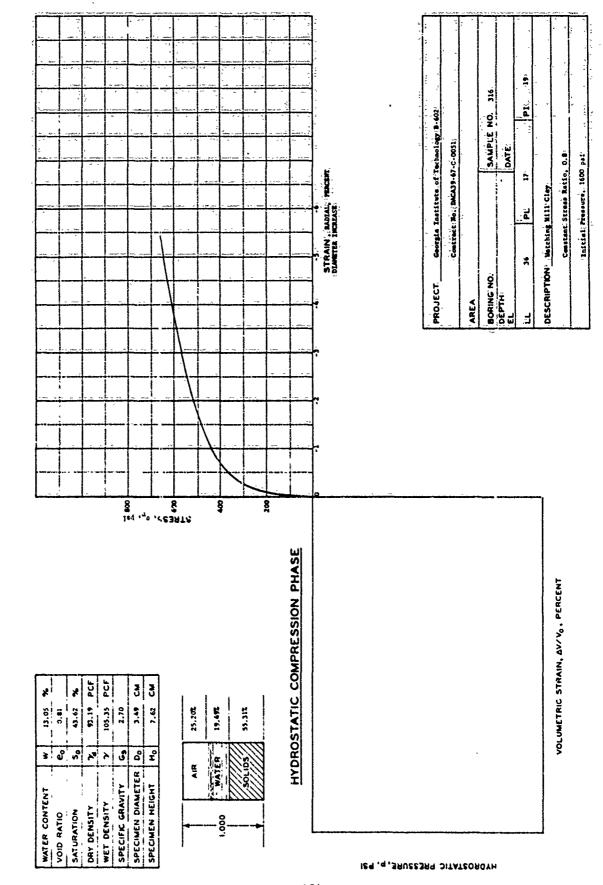




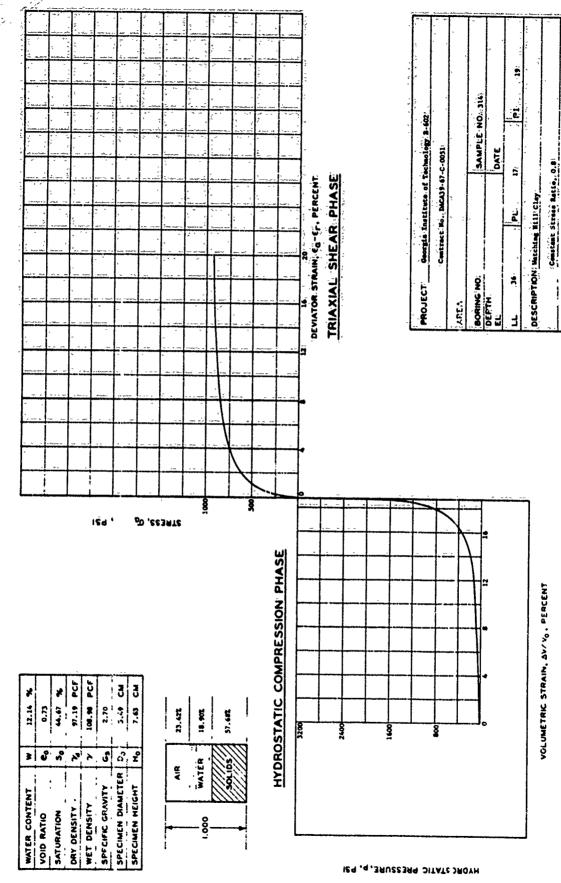




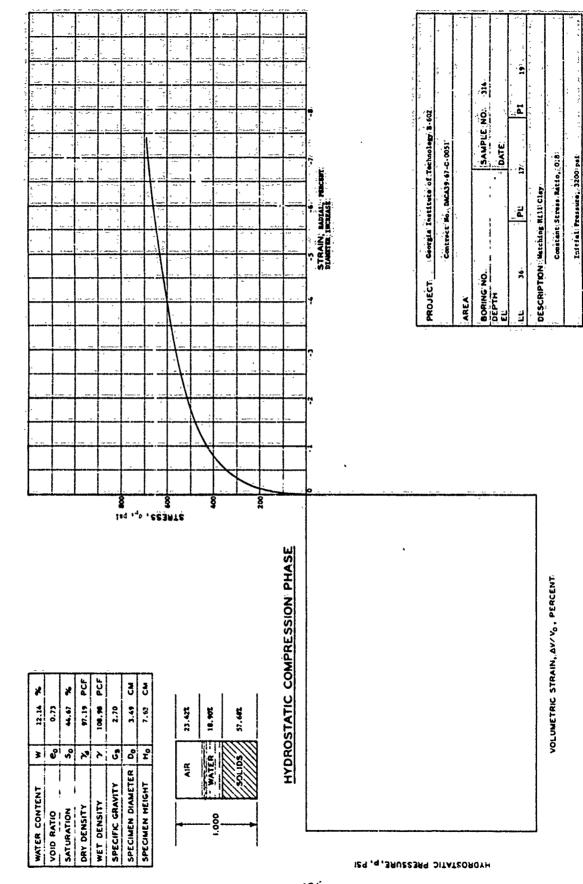


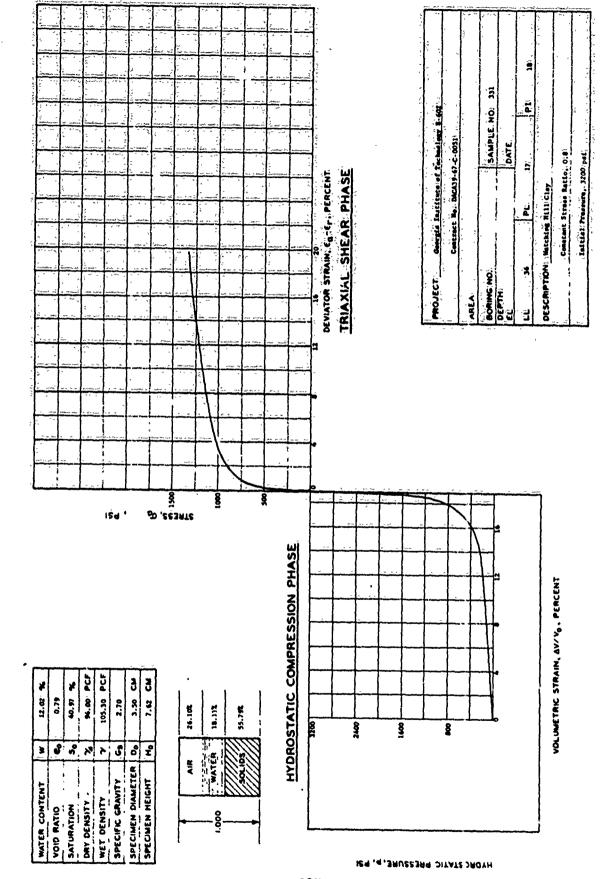


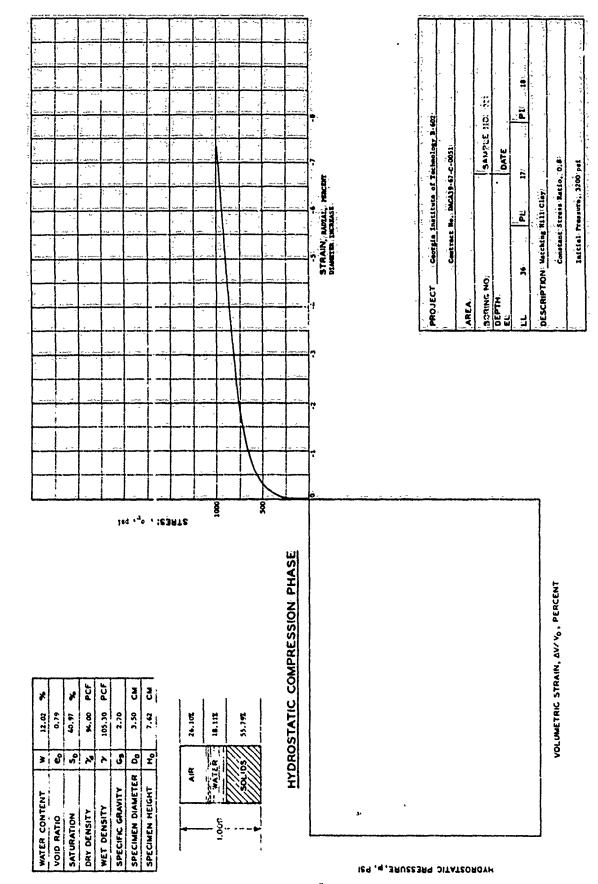
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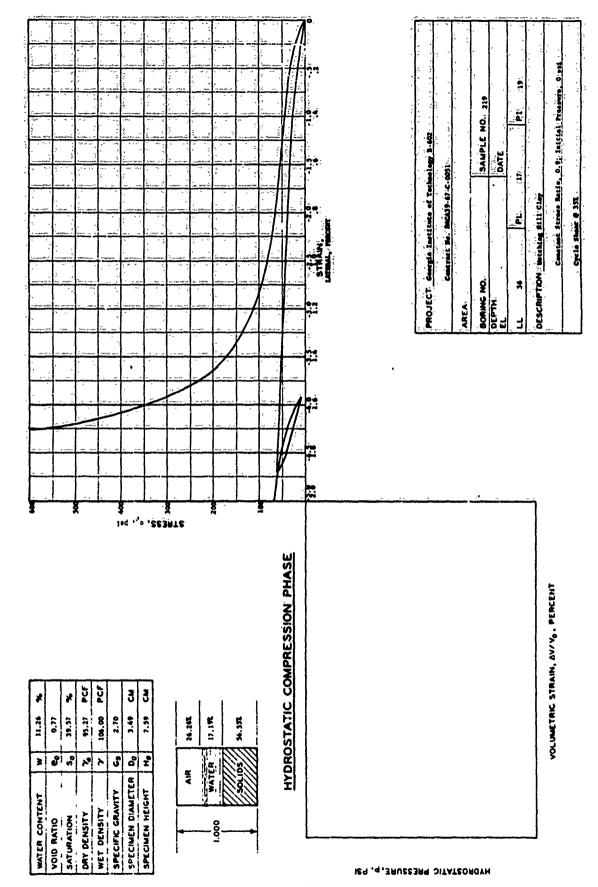
Initial Presents, [3200 pet]



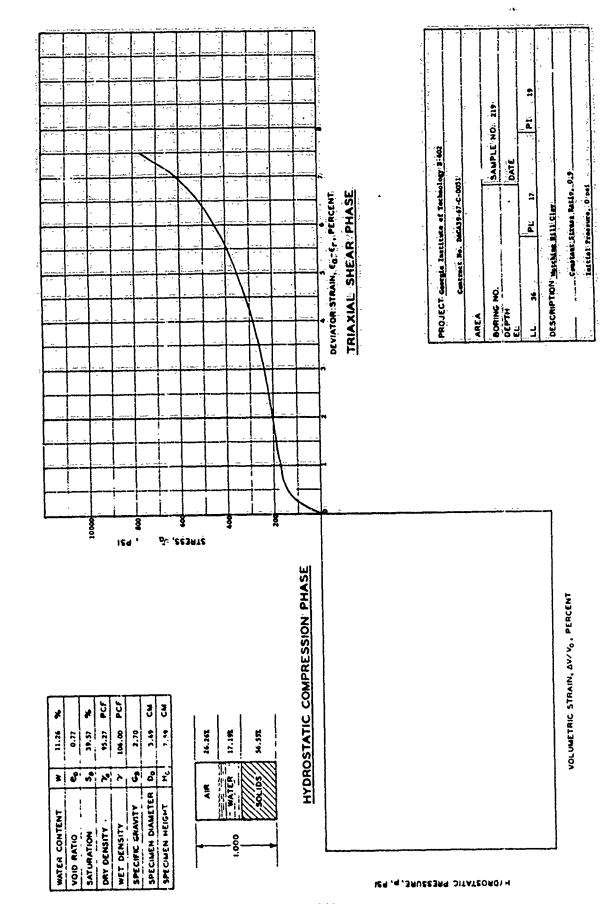




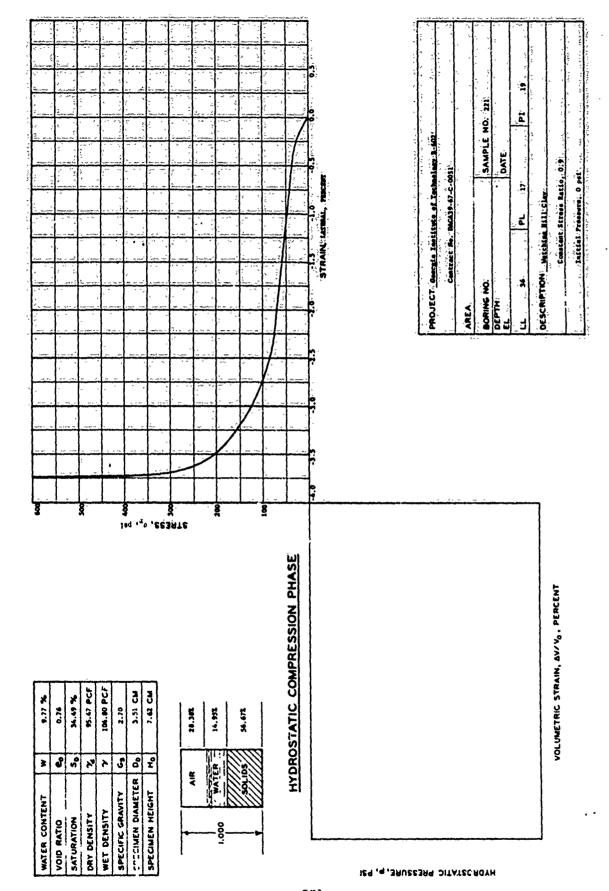
2000年,1900年

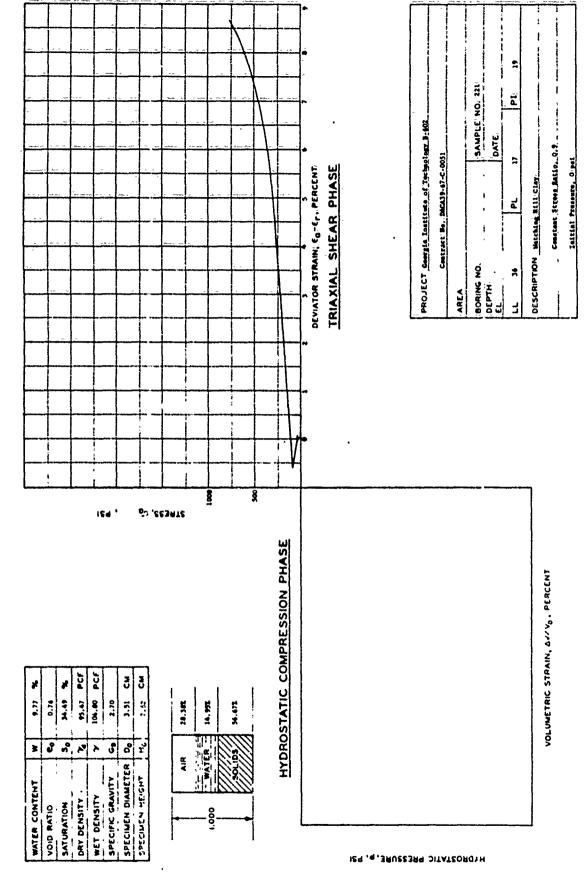


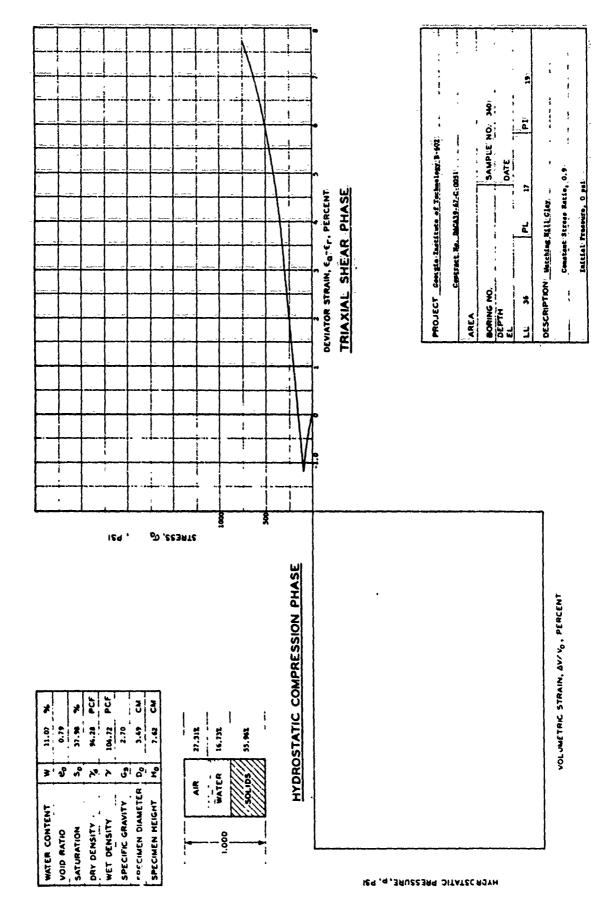
这个,我们就是这个时间,我们是这个时间,我们就是这个时间,我们就是这个时间,我们就是这个时间,我们就是这个时间,我们就是这个时间,我们就是这个时间,我们就是这个 第一个时间,我们就是这一个时间,我们就是这一个时间,我们就是这个时间,我们就是这个时间,我们就是这个时间,我们就是这个时间,我们就是这个时间,我们就是这个时间,

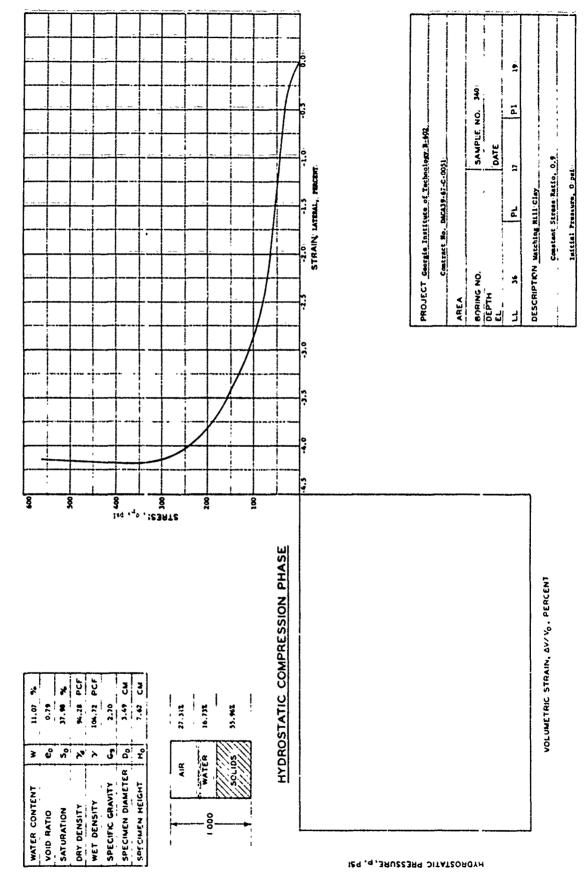


,这种是一种,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是 第一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人,我们是一个人





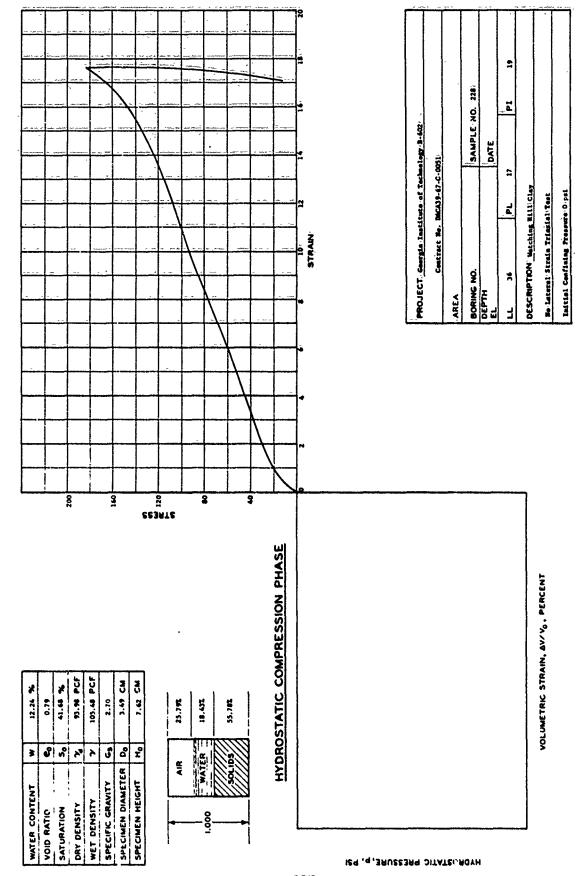




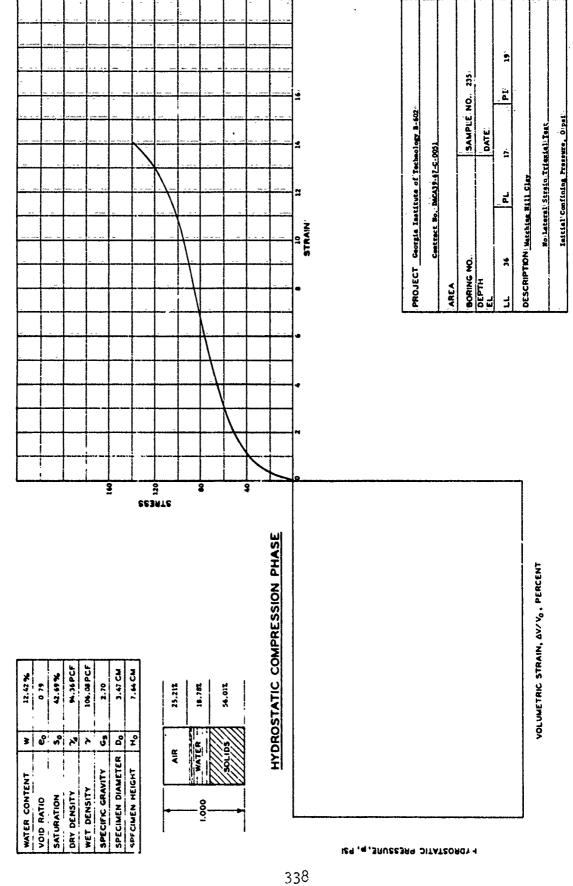
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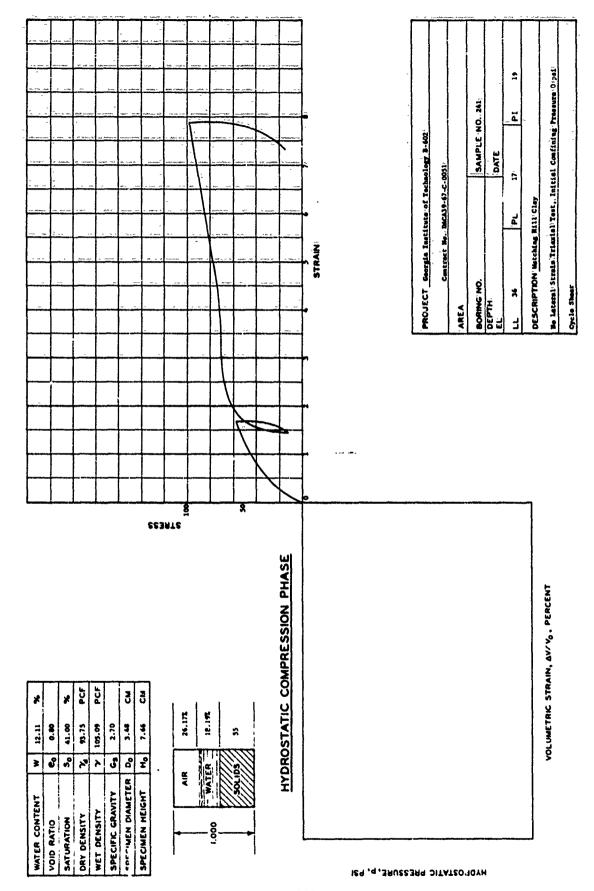
Group D

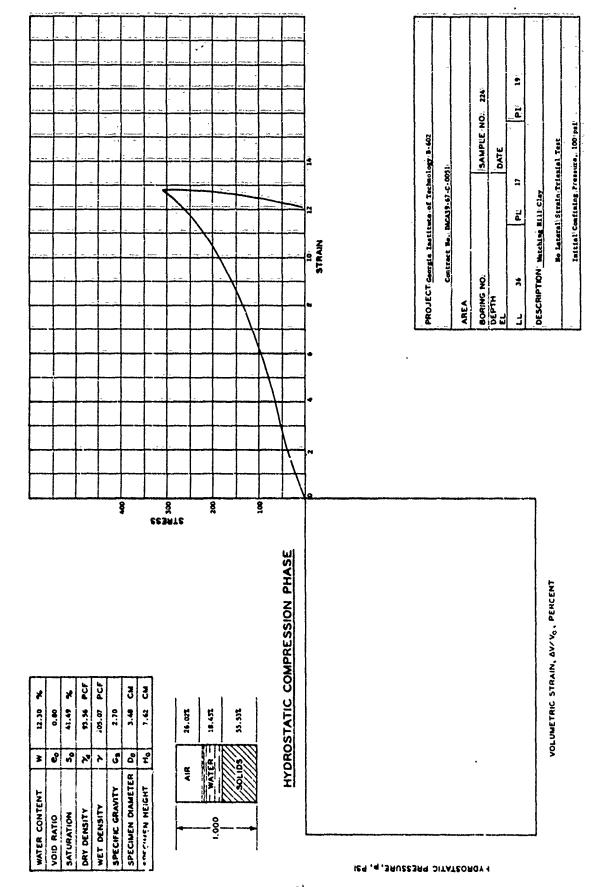
No-Lateral-Strain Tests

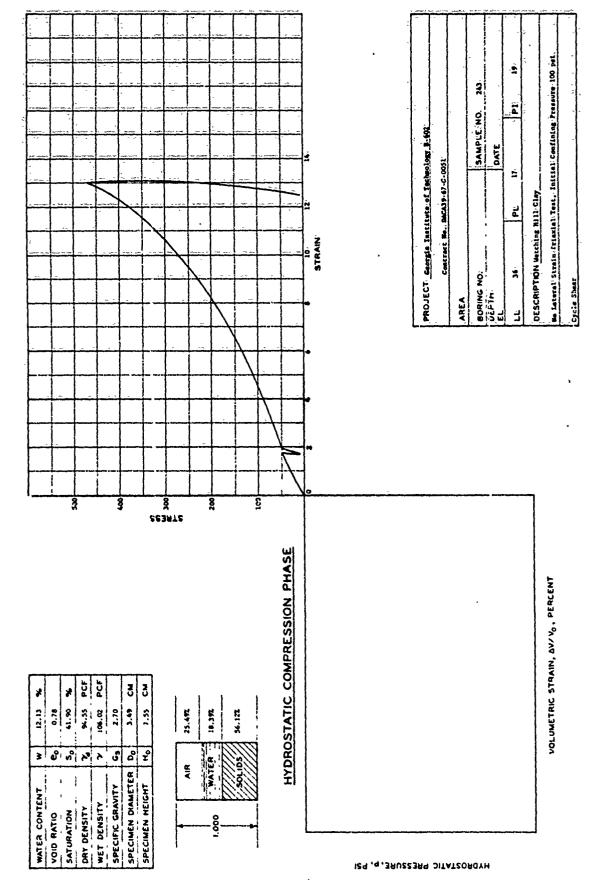


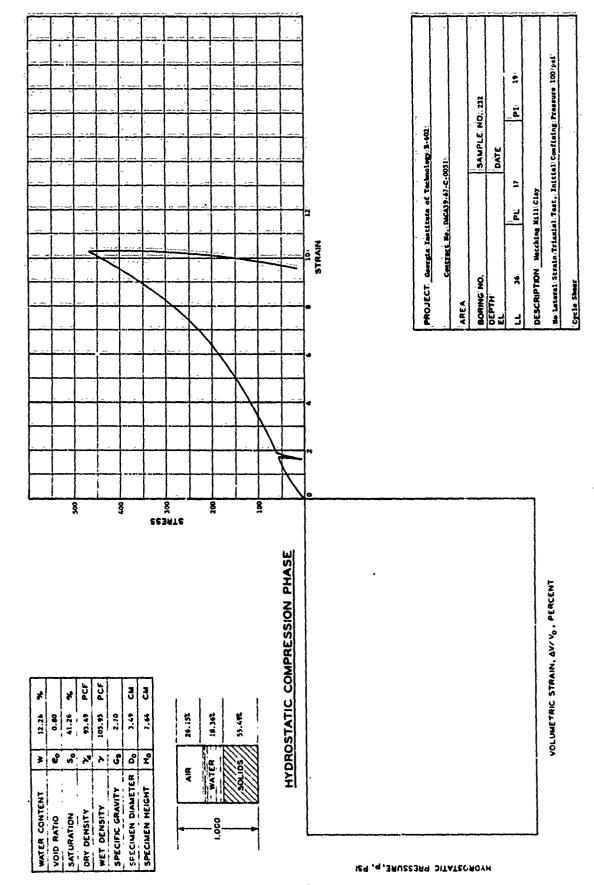
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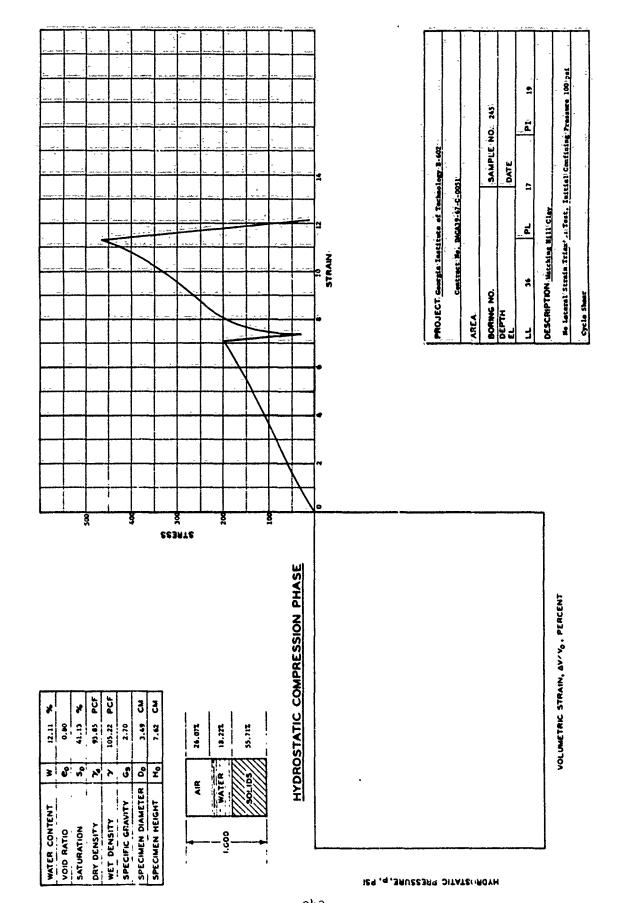


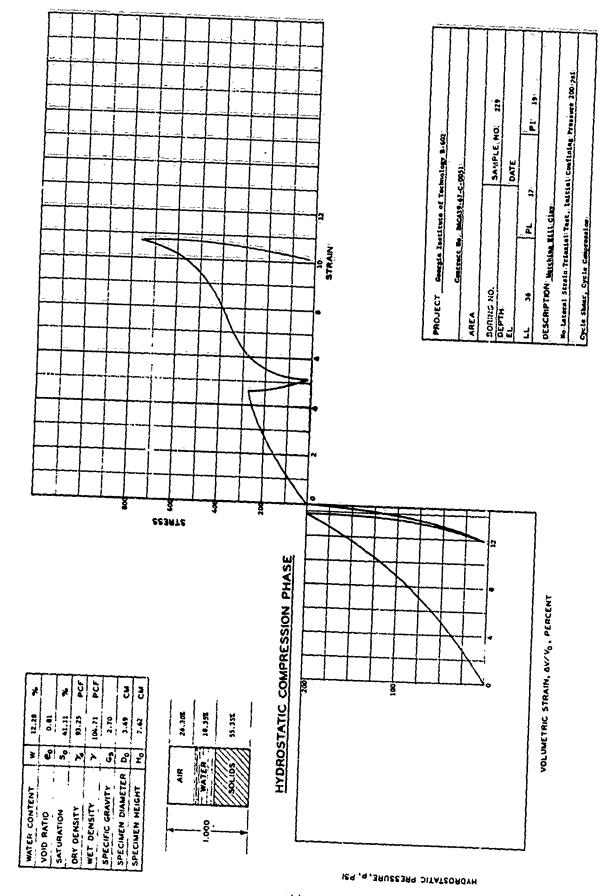




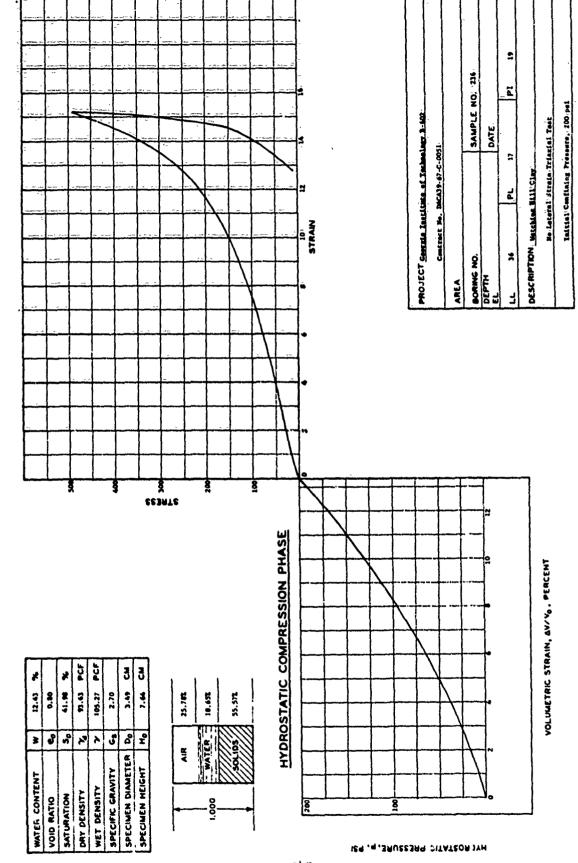


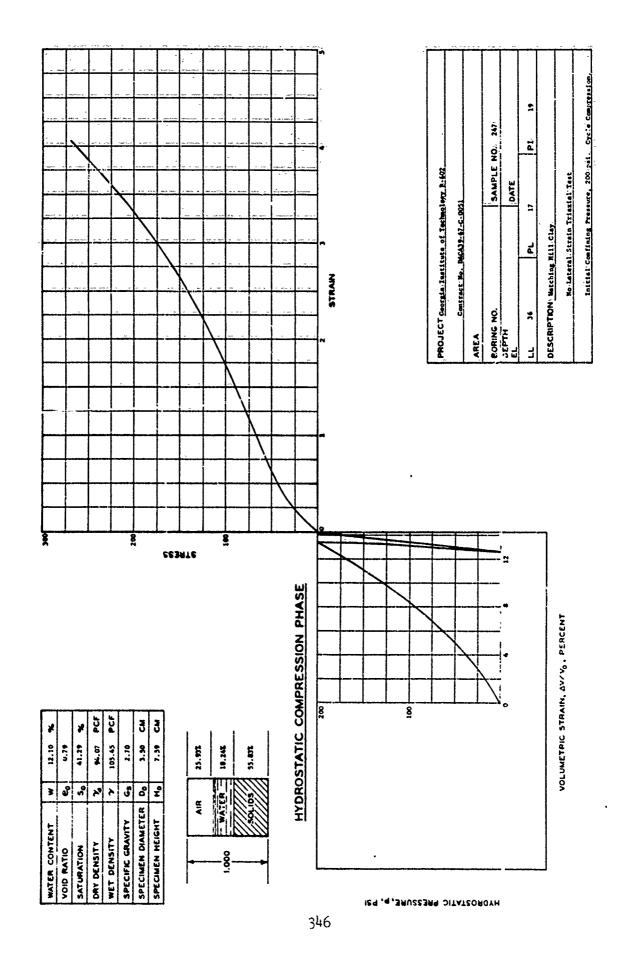




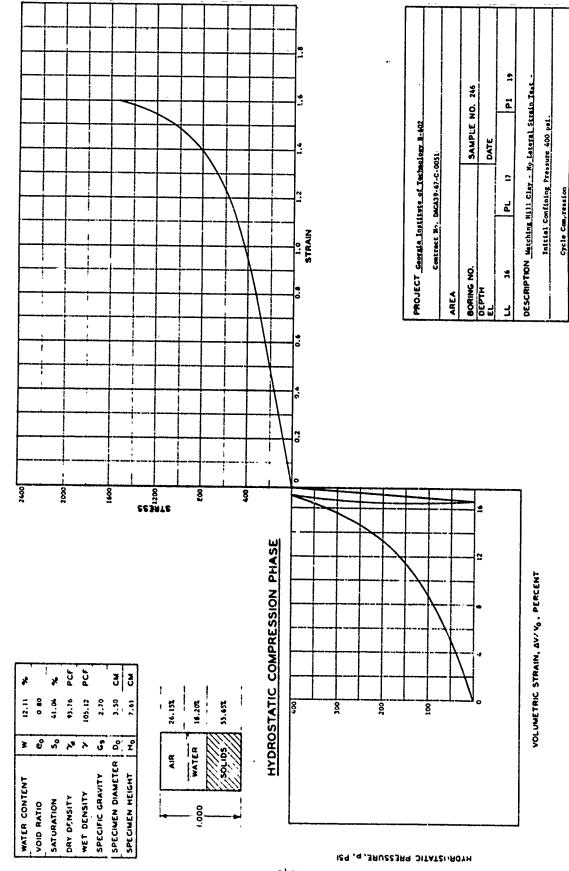


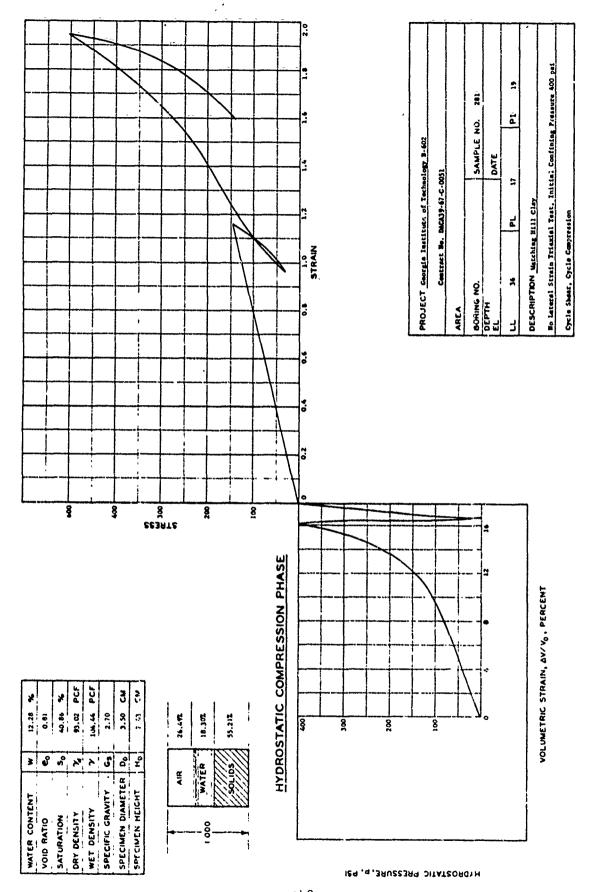
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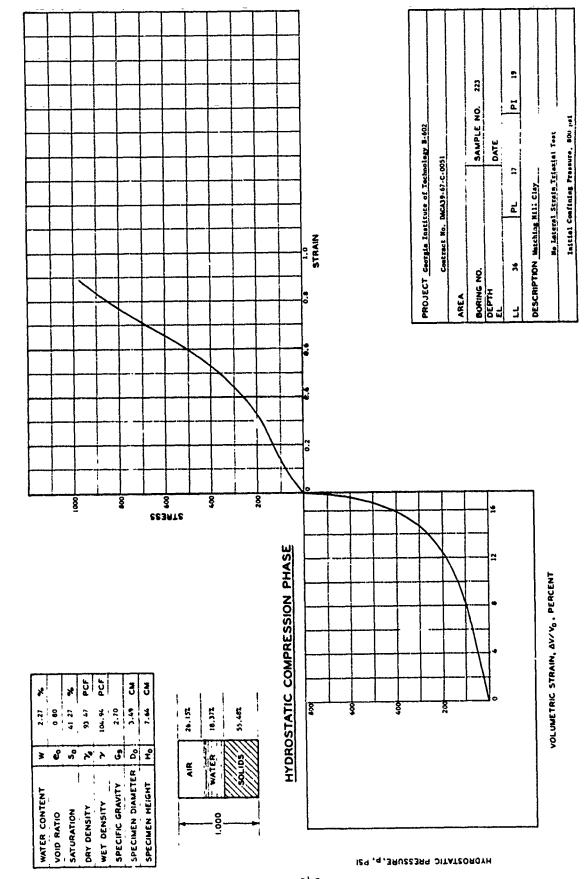


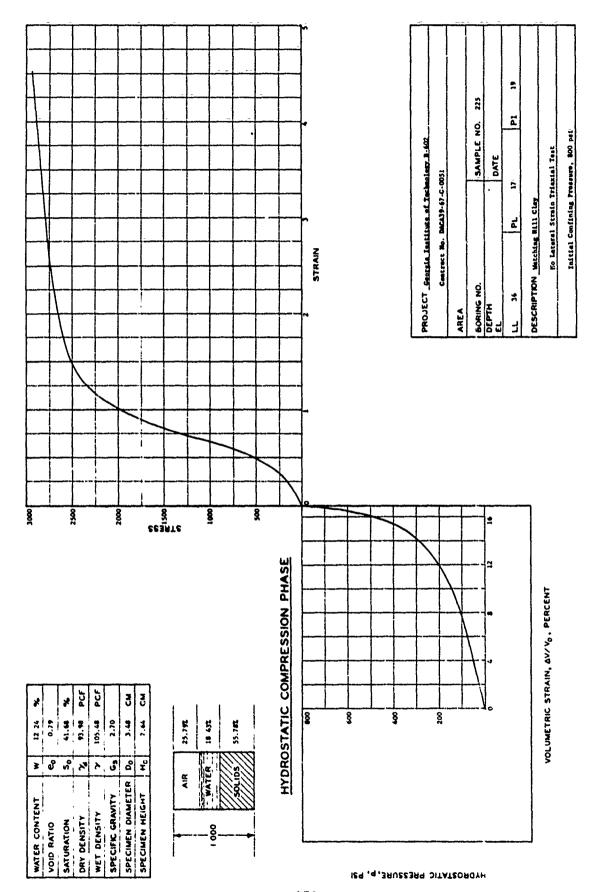


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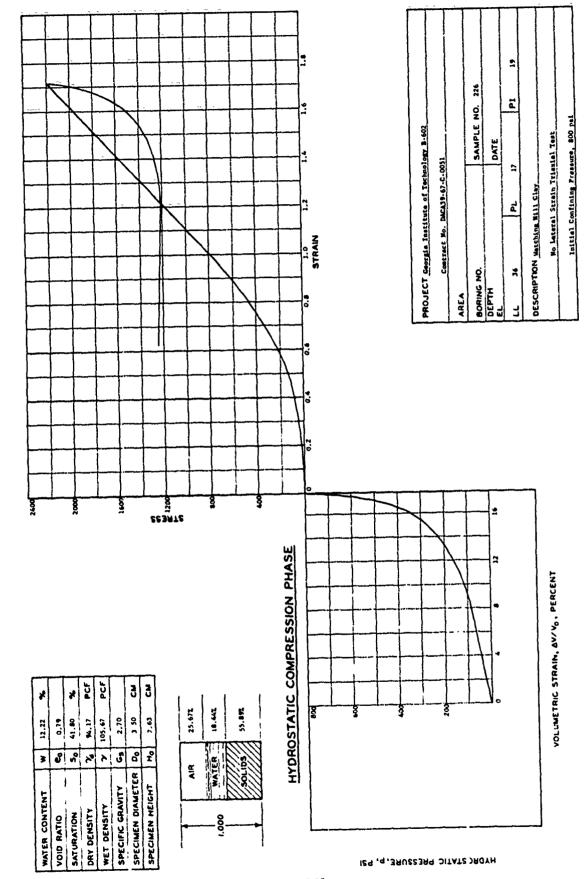


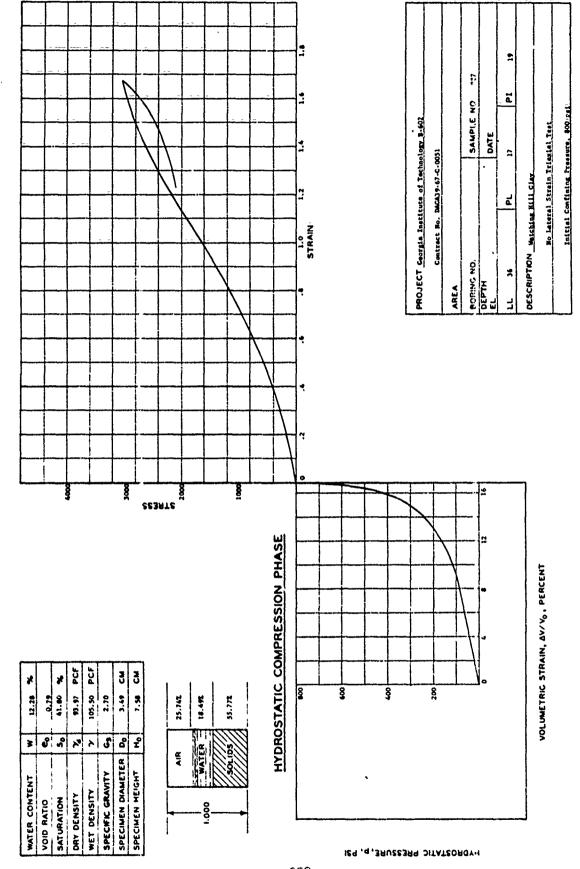


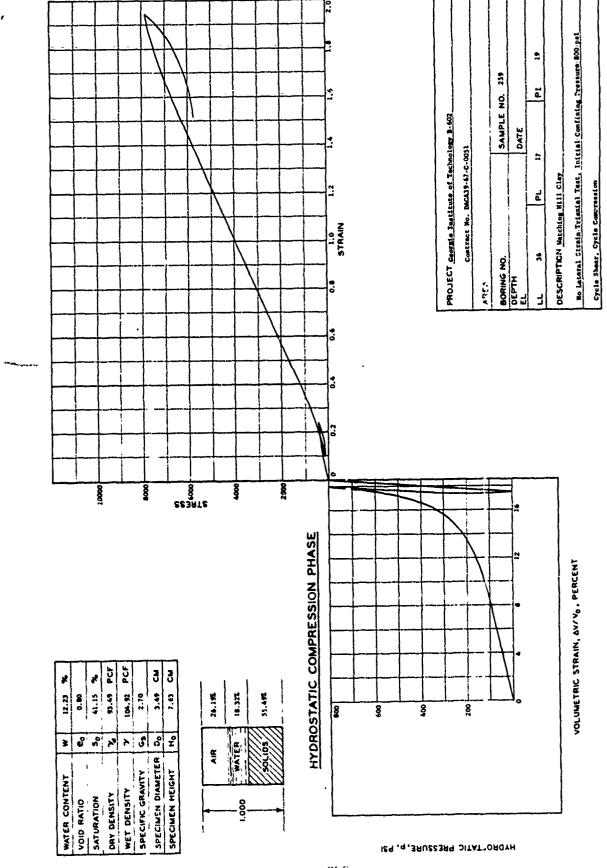


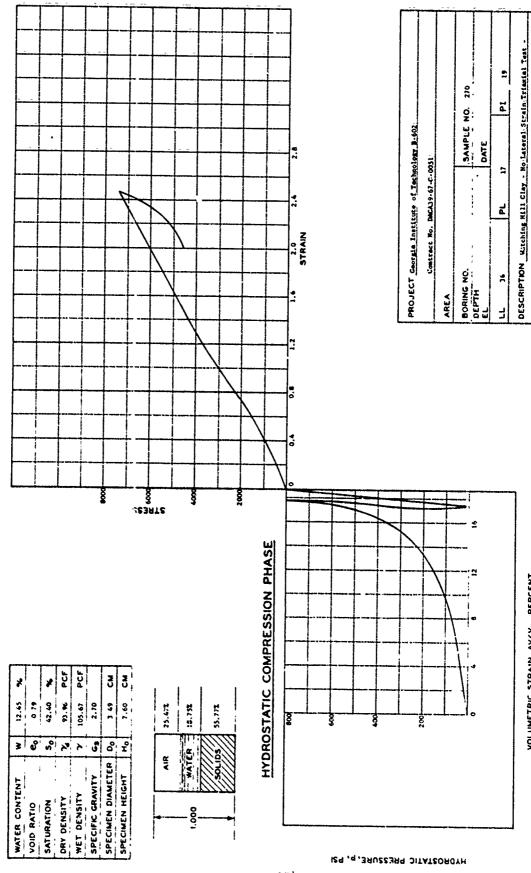


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Initial Confining Pressure, 800-psi

VOLUMETRIC STRAIN, AV/Vo., PERCENT

Cycle Compression

